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INSTITUTES OF LOGIC

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BY

JOHN VEITCH, LL.D.

PROFESSOR OF LOGIC AND RHETORIC IN THE
UNIVERSITY OF GLASGOW

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PREFATORY NOTE.

THIS volume is designed both for those who are commencing the study of Logic, and for those who have gone beyond the elements to the higher questions of the science. The portion of the volume which is printed in smaller type, as also the more strictly historical parts, may, as a rule, be omitted in the first reading by those who have not already mastered the main principles of General Logic.

J. V.

THE LOANING, PEBBLES,

October 24, 1885.

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INSTITUTES OF LOGIC.

PART I.

LOGICAL PSYCHOLOGY. HISTORICAL NOTICES. THE LAWS OF THOUGHT.

CHAPTER I.

INTRODUCTORY—LOGIC: ITS NATURE; RELATION TO PSYCHOLOGY
AND METAPHYSICS.

§ 1. THE central conception of Intellectual Philosophy is that implied in the term Truth. This, with the cognate term Certainty, indicates the aim of intellectual effort as animated by the natural desire of knowing. Knowing has various ends or degrees. We may seek simply to know ordinary matters of fact, to acquire science, to go back on the first principles and laws of knowledge itself. We may rest in the individual fact, we may generalise and classify, we may speculate on what is ultimate in knowledge. In each case, however, what we seek is Truth and Certainty.

§ 2. Speaking generally, Truth is the harmony or conformity between fact or reality and our knowledge of it. Fact may mean either an individual thing, quality, object, or a class or law, generalised or necessary, of matter or mind. Conformity always implies a certain plurality or dualism, for of

the same to the same there is no conformity, only identity. Certainty is the consciousness of truth,—conviction, as resting on evidence, immediate or mediate.

§ 3. In ordinary knowledge, in history, in science, we aim at truths rather than Truth. Each fact, event, each law of nature, adequately known is in the mind a truth; and a body of these laws, co-ordinated, classified, systematised, is a science in a more or less perfect form. We may ask the question, What are the truths of history or of science, and seek to find them. This would be historical or scientific knowledge. But we may also ask the question, What is Truth?—truth itself—the essence or inner being of it, so to speak. What have truths in common that we call them truths? Can we get the mark, criterion, test of truth itself, or of this or that truth? How far can we go in assuring ourselves that what we believe to be true is true? And what is the meaning, or what are the meanings, of saying that there is truth, or that a given proposition is true? This is the question, or set of questions, with which Intellectual Philosophy is concerned. It occupies itself with the nature, conditions, criteria of truth.

§ 4. If we take this question of what is truth, or true knowledge, in its widest generality, it is obvious that we must raise the questions as to the ultimate ground and nature of knowledge and certainty. Supposing that we know at all, or believe that we know, as a matter of fact, this knowledge must have a ground or beginning, for as at least. "If it is not possible," says Aristotle, "to know first things, neither can we know, either absolutely or properly, things which result from these, but by hypothesis, if these exist. All science is not demonstrative, but the science of the immediate is indemonstrable. . . . Some time or other we must stop at immediate (propositions)."¹ And we thus are confronted with the question as to the first principle or principles of knowledge. And as true knowledge is real knowledge, or knowledge of what is, we are met by the correlative question as to what we know of the real,—what reality is, and what are its kinds. A science of knowledge, therefore, in its widest scope would be a science of first principles, and of being as it stands in knowledge. This would lead to the discussion of the difference between phenomenal reality or knowledge, so called, and

¹ Aristotle, *An. Post.*, I. i. c. 3, 4.

substantial reality,—what is the nature and what the limits, if any, of our experience.

§ 5. These questions touching the nature of reality, the nature of the various objects of our knowledge, have been properly assigned to that branch of Philosophy known as Metaphysics or Ontology. We may confine our inquiries into the laws and conditions of our knowledge of the contents of experience, without, for example, considering whether these contents have a simply subjective reality, are mere conscious impressions, or, as known, are something more and other than this. We may further carry on this inquiry without considering the question as to the nature of ultimate or primary reality. It is sufficient for this end that we know, and know what we call objects, whatever these be in their essence or origin. That we are conscious, that we have experience at all, is a sufficient basis for certain questions regarding the conditions and possibility of this experience.

§ 6. The discussion even of these ultimate questions may presuppose that there are certain laws or features of knowledge,—universal and essential in knowledge,—and thus there may be a science which precedes even such discussion, as regulating human intelligence and thought itself, or the very conception of an object of knowledge itself. And if there be such a science, it will have a place of its own, and be so far independent of and above all other sciences. It would profess to lay down the conditions of the knowable, and especially of the thinkable,—that is, to state certain laws or principles without which there is no object of knowledge or thought for us at all. As such, it will be found to embrace certain conditions of knowledge and thought, apart from the fulfilment of which the ideal existence of an object, or an object in knowledge, is not possible. This impossibility may arise from two sides: first, from the side of knowledge. Here there are certain conditions to be fulfilled ere an object can be an object of knowledge or thought at all. These are the conditions of Identity and Non-contradiction, and they are inseparable from the nature of the act of knowing. Certain conditions lie on the side of the object as existing, and these are given in the object or with the object. They form the essential elements or relations of the object. These are the relations of Subject and Object,—Qualitative, as Substance

and Quality; Quantitative, as Time, Space, &c. These are properly metaphysical relations. They are part of the matter of knowledge,—the given, yet essential, relations of things.

§ 7. The questions regarding the metaphysical laws of knowledge are, first, as to their nature, number, genesis; secondly, as to their objective validity, or agreement with the nature of things. The first question is obviously psychological. It is a question of mental genesis. The second question may be regarded as coming under Logic, in as far as this science is led to deal with Evidence, immediate or mediate. This would form a special section of Logic rather than be the adequate object of the science itself. But the true relation of the metaphysical laws to Logic is simply that of being part of the matter of thought, in this case necessary matter to be legislated for in common with other matter. Logic can only, consistently with its specific scientific character, treat such concepts as Cause, Substance, Unity, Identity, as Concepts.

§ 8. There may further be a question as to whether the logical laws are independent, or are deducible from certain corresponding metaphysical laws. But this is properly a psychological question,—pertaining, it may be, to logical science. It concerns Logic only indirectly, especially if it be admitted that the logical laws are necessary and universal, for the results of those laws would be the same whether their necessity be primitive or derived from other necessary laws. Meanwhile, it is sufficient to say that it will be found that the logical laws are not derivable from any source higher than themselves, but are in fact presupposed in every known concept or law which can be in our consciousness—i.e., in every process of analysis or reasoning, which might be adduced to show their derivation.

§ 9. Logic Proper,—Pure or Formal Logic,—is the science of the conditions of the knowable and thinkable, in so far as these depend on the inherent constitution of the acts of knowing and thinking; and these acts are regulated by strict laws, called formal, inasmuch as their violation destroys the form or ideal being of the act and object of thought,—as known or thought. Formal Logic is the science of the laws of possible, consistent, and necessarily connected thinking, or of harmony and of necessary implication in thinking.

§ 10. But knowledge, true knowledge, of experience has what may be called a contingent side. Something is given, presented; and this something is very various, and not originally deducible or even predictable. There is the matter of experience, of knowledge and thought. That something be given to the knowing faculty, to sense, or intuition, is an absolute condition of knowledge. Thought without intuition is vain, empty. Here, too, we touch psychology, the analysis of the intuition and its matter. But all that we need meanwhile to carry away is, that there is necessarily a given to help to constitute knowledge. And this is variable, passing, contingent. How much of it is subjective, how much objective, is a separate question. Metaphysics considers this. As this given is essential to knowledge, it is essential to true knowledge. And we have to inquire as to how we are to secure the truth of our knowledge of the matter presented, or of the intuition or presentation. How is knowledge accurately to represent what is presented to us in the course of experience? How are we to get not only at the individual or isolated fact, but at the law or laws which individual facts embody? How are we to reach the classes, laws, causes, which we suppose to be in experience? How, in a word, are we to acquire the truths of science? There is a science which has for its aim to investigate the rules or laws of the processes by which we observe, generalise, and infer through induction and analogy, and not less through deduction. This is properly enough a part of Logic, in the wide sense of the term. It is known narrowly as Inductive Logic. It makes a part of what Hamilton calls Modified or Mixed Logic. By some it is called Applied Logic; but this should not be understood as a special Logic, which is Logic in general applied in this or that determinate matter or science. For the rules of Applied Logic are generally, if not universally, applicable to the sciences, and this Logic involves also the universal use or application of the canons of Pure Logic.

§ 11. This problem of the conditions of truth thus presents different aspects; and, according as we regard one or other, we have a different speculative science, different, yet converging in one great organic unity. Thus Psychology in dealing with the Intelligence looks at the act of knowing as it exists as a fact, or is spontaneously manifested in the consciousness,

at its nature, kinds, degrees. It cannot be denied that we know, or believe we know. Even in such a denial there would be an assertion of knowledge. Knowing is a fact or phenomenon of experience. It is the inner fact of our being; it is our being, so far. We are, as we know. Logic, too, looks at this act as fact. So far, it is identical with Psychology. But Logic looks at the fact of knowing with a view to ascertain its conditions, laws, if it have any, how it is carried on, and what it is when it is finished. And Logic professes to find that knowing is subject to certain conditions, and to show that these conditions are of two different kinds at least; and, these being ascertained, to exhibit them in a scientific way, to formulate them, make a body of knowledge of them; and, now indifferent to the actual fact whether knowing is going on or not in this or that matter or science, to show ideally how it must go on, if it is to be successful in its aim, or even to be at all. While Psychology is thus the science of the facts of Intelligence, or of knowing, and also of its actual laws as matter of experience, a science of facts or phenomena of our conscious intelligence, as realities, Logic takes from it the laws which it reveals, the laws of the acquisition, the ordering, classification, and concatenation of knowledge, and represents these as ideal abstractions universally applicable in the processes of intelligence. Logic is thus wholly dependent on Psychology for its principles. It is Psychology carried up to its highest abstraction. And the moment it loses hold of Psychology, Logic becomes arbitrary and unreliable, no longer applicable to the facts of experience. The nominal difference between the two sciences is simply that Psychology regards rather knowing in process, while Logic regards knowing as completed, as a product, and the laws which it has realised or fulfilled in becoming what it is, or in reaching what it attains.

§ 12. Psychology thus, to a certain extent, and the method of Psychology, observation of the actual procedure of the understanding, are necessary to the knowledge of the nature and laws of the understanding. The understanding is simply the conscious mind acting and being conscious of its action in a definite manner, and about a definite object. In thus acting it realises the law of its action; it thinks—i.e., conceives, judges, or reasons coherently. Analysis and reflection

bring out with a fuller consciousness the law or laws which it naturally observes, and also reveal the necessity and universality of the law. In no sense whatever does this analysis create the law; in no sense whatever does it impose the law on the understanding. The law is revealed in a definite instance, and it is shown by reflection to be supreme in all instances.

(a) Kant objects to the introduction of psychological principles into Logic, or drawing the laws of thought from psychological observation. The reason he gives is, that thus we should get only *contingent*, not *necessary* laws; and the question is not as to how we think, but as to how we ought to think. The necessary use of the understanding is discovered without any psychology. To this it is sufficient to say that observation, followed by generalisation, would give us only contingent principles; but observation of the actual procedure of the understanding, followed by reflection, or an experimental testing of the procedure, may and does give us the necessary element in the process. We can learn how we ought to think only through an analysis of how we actually think, when we think consistently, i.e., think at all. Indeed, Kant himself subsequently admits all that need be contended for here, when he says "the necessary laws of thought can and ought to be conceived *a priori*, independently of the natural and concrete exercise of the understanding and the reason, although they can at first be found only by observation of this exercise." On this point, as elsewhere, especially in the *Critique*, Kant shows that he had no clear idea of the scope of Psychology, of its method, and only slight acquaintance with the details of the science.

He further excludes Psychology from Logic on the ground that Logic seeks to know not the contingent but the necessary, not how the understanding thinks, and has thought, but how it ought to think, the accord of the understanding with itself. This assumes that there can be no necessary exercise of the understanding in a given instance,—for example, no absolutely necessary implication in a given reasoning performed by the understanding, and consciously known to be necessary; whereas, this necessary relation is given and consciously realised in a single instance of valid reasoning. Kant thus confuses the particular or singular with the contingent.

It assumes, further, that the understanding may think in experience in a way different from that in which it must think, if it thinks at all. This is not so. There is only one way of thinking by the understanding, that is, the legitimate way. Any other is a mere illusion, not a reality of thought at all. And there is no reason why the understanding may not naturally perform its process of thinking rightly rather than wrongly.

(b) One of the current Hegelian assertions, which is regarded as new and important, is that "the knowledge of what knows cannot precede the knowledge of reality." No one, I should think, ever alleged, or at least required to allege, the converse of this. The

knowledge of what knows is and can only be found in the knowledge of reality. We perceive, judge, and reason; we get at, or think we get at, reality in our intuitions and judgments. But the philosopher says we get at more,—we get at a knowledge of what knows, if only we will think of what a knowledge of reality is and means. For therein are manifested the character and law of the knower as well. And if we are ever to know the nature of the knower or knowing subject, we are to do it by a reflection on the spontaneous acts of knowledge,—which are conversant directly with the reality, and reflexly show the reality in consciousness. But for this secondary or reflective knowledge, we should be wholly unable to estimate the value and reach of our knowing, and only through this could we correct, if need be, our spontaneous or intuitive knowledge.

CHAPTER II.

HISTORICAL NOTICES—ARISTOTLE—HIS VIEW OF LOGIC.

§ 13. The ultimate aim of Aristotle in his logical treatises, especially those on the more advanced parts of the science,—the Prior and Posterior Analytics,—is to show the nature and laws of true Demonstration (*ἀπὸδείξις*). In the opening of the Prior Analytics (l. i. c. 1) he tells us that the treatise concerns demonstration, and is undertaken for the sake of demonstrative science, and that consequently he has to define proposition, term, and syllogism. This affords a certain ground for a division of the parts of Logic, and the arrangement of the Aristotelic treatises. (1) The theory of the elements of the proposition, that is, the term, given in the Categories. (2) That of the proposition in the treatise On Interpretation. (3) That of the syllogism in the Prior Analytics. (4) That of demonstration in the Posterior Analytics. These may be regarded as exhausting the essential parts of Logic, and as constituting Theoretical or Pure Logic. The Topics and the Sophistical Elenchi may be taken as in Applied Logic. In the Analytics and in the Topics, Aristotle treats of definition and demonstration. But in the former he seeks to give the theory of true definition, and how it is to be constructed; in the latter, what sort of definition can be impugned. In the Analytics, demonstration is the best, which is according to the true principles of its theory; in the Topics, that demonstration is to be preferred which is the more difficult to assail. There is the difference in fact between the scientific theory of truth, and the dialectical interest of the appearance of truth and intellectual victory.¹

¹ Cf. Waitz, *An. Post.*, ii. 297.

§ 14. Aristotle tells us that he is to treat of syllogism previously to demonstration, since syllogism is more universal,*—demonstration being a certain kind of syllogism. The differentia of demonstration is, that it is a syllogism from necessary matter. "If there be a demonstration that a thing cannot subsist otherwise, the (demonstrative) syllogism must be from necessary (propositions). For it is possible, without demonstration, to syllogise from what are true, but we cannot do so from things necessary except by demonstration, for this is now (the essence) of demonstration. . . . It is possible to syllogise the necessary from things not necessary, just as we may the true from things not true; still when the medium is from necessity, the conclusion is also of necessity, as the true results from the true always."¹

In the Posterior Analytics he expressly expounds the theory of demonstration, with a view to show the use of syllogistic in the constitution of true and certain science,—the science of necessary principles and its consequences, including the question of their guarantee. *Ἐπιστήμη ἀποδεικτική* has thus been translated the theory of knowledge, and regarded as part of Philosophy. On these grounds, it is held by St Hilaire and others that Aristotle viewed demonstration as the proper object of the books of the Organon, and of the science afterwards named *Logic*.²

§ 15. The principles of science (*ἀρχαί*), according to Aristotle, are *κοιναί* and *ἰδιαί*: under the former are, *ἀξιώματα*, the original premises from which demonstration proceeds; under the latter, assumptions, *θέσεις*,—that is, definitions, *ὀρισμοί*, and hypotheses (*ὑποθέσεις*), assumptions of the existence of the subjects.³

§ 16. The difference between a demonstrative and a dialectical proposition is, that the former is assumed by the demonstrator, the latter is accepted from another person. So far, however, as syllogising from either proposition is concerned, this difference, as Aristotle admits, is of no moment. All that the syllogism supposes is, that something is or is not present with something. We do not need to inquire why one thing is predicated of another; all that we require is that it be predicated. A syllogistic proposition (*πρότασις*) is an

¹ *Post. An.*, i. 6.

² Cf. St Hilaire, *Organon*, art. *Logique*, *Dictionnaire de S. P.*

³ Cf. *An. Post.*, i. 2; Mansel, *Prolog.*, App.

affirmation or negation ; it is demonstrative (*ἀποδεικτική*) if it is true, and assumed on primitive data. By the phrase *αἱ ἐξ ἀρχῆς ὑποθέσεις* is meant axioms (*ἀξιώματα*) whose truth is indemonstrable and self-evident. The demonstrative proposition is thus of necessary matter. Thus *X must be Y*; but, so far as the syllogistic act is concerned, this is not affected by the necessity,—i.e. the modality,—of the proposition. The consequence in syllogism is as necessary whether the major proposition be apodeictic,—that is, of necessary matter or relation between the terms ; or merely assertory,—that is, of a simple categorical relation, *X is Y*. The difference is purely extra-logical ; the conclusion, as a proposition in the case of necessary matter, is a necessary proposition ; it must be true, or, as Aristotle puts it better, it must be thought in one form, and as excluding its opposite. But this is a peculiarity attaching to the matter of the proposition, not to the sequence of it from the premises, or its form.

§ 17. It would be manifestly impossible to have a science of reasoning or inference, if we were to ask the title of every proposition to be regarded as necessary or as contingent, or as more than assertory. We should require in each case to go into Physical Science and Psychology to determine this point, and the inquiry would be endless. Besides, if the consequence of the inference depended on the modality of the proposition, there could be no one science of inference : conclusions would be necessary or probable according to the matter. Probability would have its ever-varying degrees, and a science of pure inference would be impossible.

The modality of necessity and contingency has no bearing on the nature of the sequence, or on the conclusion as a conclusion. It is, therefore, wholly extra-logical. The quantity and the quality of a proposition affect, not the sequence, but the quantity and quality of the conclusion, as a conclusion from given premises ; and hence they are to be regarded in the data as modifying the conclusion. Thus modality, as quantity and quality, if the term be stretched so far, may be regarded as of logical import ; but no other kind of modality is of any relevancy.¹

§ 18. Further, if it be true, as is alleged, that the canon of demonstration is the principle that “two things compared and found equal to a third, are equal to one another,”²

¹ Cf. Mansel, *Prol. Log.*, Appendix, Note H.

² *Post. An.*, i. 10.

it is clear that demonstration has no law independent of ordinary syllogistic; for this canon depends almost immediately on the law of non-contradiction. This, as stated by Aristotle, is—"It is impossible that the same attribute should be and not be in the same subject, at the same instant and under the same relation."¹

§ 19. In truth, demonstration, according to Aristotle, does not need to assume the common axiom in all its universality, but only in so far as is required by the genus about which the demonstration is concerned. The geometrician in demonstrating assumes, not that every whole is greater than the sum of its parts, but that every whole in the genus magnitude is; and the arithmetician does the same in respect of numbers. Demonstration is, in fact, not the whole of Logic, or the theory of Pure Logic, but an Applied Logic,—logic applied to necessary matter.

§ 20. It is held that while physical science is observational and inductive, and therefore of contingent value, demonstration may intervene and give absolute certainty. Thus a body is known to fall to the ground. This is a fact of observation and induction simply. But the fact may be connected with the laws of motion, and thus demonstrated. Or the planetary movements may be observed and described, and then led back to and predicted from the law of universal gravity. But in neither of those cases is there demonstration resulting in absolute certainty. There is simply the reference of a fact or law to a higher or wider law than itself. But this higher law is not a truth of absolute necessity, any more than the narrower law which is referred to it. It is a case simply of deduction; and the certainty may be complete, given the higher law. But it is, after all, only a hypothetical necessity which subsists, because the universal, though to thought contingent, law, exists.

(a) *Organon* (*ὄργανον*) generally, and with Aristotle, means simply *instrument*, or that which subserves the accomplishment of some end. The soul is compared to the hand, which is the *ὄργανον* *ὁρῶν*.—(*De Anima*, ii. 8.) To discover the for and against of each question is a useful instrument for science and reflection.—(*Topica*, viii. 14. Cf. i. 13.) The term *Organon*, as subsequently applied to the six logical treatises of Aristotle, was wholly unrecognised by their author. As a general designation, it was equally unknown to the Greek interpreters, and down to the time of Psellus and Blemmides, the name for

¹ *Met.*, iii. c. 3.

of Aristotle afterwards comprised in the *Organon* was ἡ λογική, or ἡ λογική ἐπιστήμη, or πραγματεία. Diogenes Laertius had said that Aristotle made Logic ὄργανον προσηκριβωμένον. It was, however, through the Greek interpreters that the term *Organon* came ultimately to be so generally applied. The doctrine of the Analytics, called by them τὰ ἀποδεικτικά, was named by Alexander of Aphrodisias the ὄργανον; and the same designation was applied by Philoponus to demonstration itself. These were the instruments for reaching true and certain knowledge,—necessary truth. The term thus at first applied to the Analytics came ultimately to designate the whole logical treatises of Aristotle. In the fifth century, Ammonius and Simplicius give, either originally or from tradition, going back to Andronicus of Rhodes, or Adrastus of Aphrodisias, the logical works, as a distinct class, as λογικά ἢ ὄργανικά. David the Armenian emphasised this view. With him the Aristotelic works are divided into theoretical and practical, with the supplementary branch of the organic. The syllogism is a fan for winnowing the true from the false, the good from the bad. From the commencement of the sixth century certainly logic in the Peripatetic school was called τὸ ὄργανικόν (μέρος) of the Aristotelic philosophy. Further, a passage of Ammonius almost suggested the modern application to the logical treatises of the term organon. He says, speaking of the Introduction of Porphyry, that this work is comprised in the logical organon—ὅτι τὸ λογικὸν ὄργανον ἀνέγεται. It was not, however, until the fifteenth century that the term *Organon* came to be habitually used as the common name for the six logical treatises of Aristotle. This question of the name is connected with the controversy as to the sphere of logic,—whether it is a part simply of philosophy, or the instrument. The Stoics held the first opinion; the Peripatetics the second; the disciples of the Academy held logic to be at once science and instrument. It was no doubt with the Greek commentators that the exaggerated view of the Aristotelic logic as an instrument or method for securing real truth originated. But it was only towards the sixteenth century that some of the Peripatetics, in face of the energetic protest of Vives, maintained the extreme view of logic as the method of real truth,—a view which was not only erroneous, but incapable of being put into practice. Hence arose the misconceptions of Bacon and Locke regarding the real Aristotle, which were excusable only on the part of the class of non-reading philosophers. No such view can fairly be attributed to Aristotle himself, notwithstanding what he says about demonstration. "It is not," says St Hilaire, "an organon which Aristotle professes to give to philosophy; he has only intended to treat in his logical works, in the μέθοδος τῶν λόγων, of the instrument of all philosophy, of the νοῦς, which, as he himself says, is the organon of the soul,—'to the body the hand, to the soul the intellect; for the intellect is of those things naturally in us as the organon.'"—(*Prolegomena*, l. 80, quest. v.) Taken in this sense, the term organon is perfectly correct. Logic is really occupied with the instrument of all knowledge, since it is occupied with the science of thought and the form under which thought is produced—viz., reasoning.—(St Hilaire, *De la Logique d'Aristote*, t. i. Part I. c. 2. Cf. Waitz, *An. Post.*, l. 1.)

CHAPTER III.

HISTORICAL NOTICES—LOGIC SINCE ARISTOTLE.

§ 21. Since Aristotle, logical investigation has been confined to two principal lines. The one proceeds on the conception and principles of the science as laid down by its founder, in what may be regarded as their formal aspect, and seeks to add to and modify certain of the doctrines,—to introduce refinements and subtleties. The other has been the questioning of the exaggerated pretensions made by some regarding the science as a method of investigating and reaching real truth,—truth of fact or science,—and the legitimate attempt to found a method of truth and science which, rising beyond the merely formal relations of thought, strives to add to its content or matter,—to acquire, build up, arrange, and classify science. The formal view of knowledge is so exact and complete in itself, that men are led to rest in its intellectual harmonies and adaptations,—its refinements and subtleties. But the real needs of knowledge and of life have ever and again led to a protest against the mere intellectual sphere as narrow and insufficient, and compelled questions as to the best rules and methods for conducting thought through the broad field of experience, and guiding to a knowledge of fact or reality as we may find it.

§ 22. This branch of Logic may be said to have two aims,—the laws of Discovery and the conditions of Proof. In Bacon, Herschel, and Whewell, the former aim is the predominant. In Mill, and in later writers on his lines, the second aim is the main one,—his view of Logic being, that it is the science of the intellectual operations which serve for the estimate of evidence,—at once of the general procedure

which goes from the known to the unknown, and of the operations auxiliary to this fundamental operation.¹

§ 23. This inquiry in either form is in no way against the doctrine and spirit of Aristotle. The method of real science is the complement, not the antagonist, of the Aristotelic logic. Aristotle has even recognised, and, in a way, analysed inductive method. Nor is he opposed to the method which would analyse the speculative side of knowledge. He runs Demonstration back to ultimate principles, first truths, themselves indemonstrable, and thus connects logic with the First Philosophy, or theory of Ultimate Knowledge. "All demonstrative science is related to three things—which are admitted without demonstration, and these are the genus, the essential properties of which science considers; and common things called axioms, from which as primaries one demonstrates; and thirdly, the modifications of the genus, the signification of each of which the demonstrator assumes."—(*Post. An.*, i. 10, *et passim*.) It is on this side that the Aristotelic logic touches the Method of Descartes, in not being satisfied until it can connect the theory of science with the first principles of knowledge. In fact, the need felt by Plato and reflected in his Dialectic is not without an inspiring power on the whole theory and development of human thinking,—on the formal as well as the material side.

(a) Aristotle distinguishes Induction from Syllogism.—(*Top.* 12; *An. Pr.*, ii. 23.) There is a great difference, he tells us, between knowing that a thing is, and why it is. We do not attain to the knowledge of the *why* when the syllogism is not formed of immediate terms, for then we have not remounted to the primary, which is cause. The middle term here is not the primary and immediate cause. So in the case of reciprocal terms—that is, where the effect is of the same extent as the cause, and the one can be taken for the other,—the term which is not the cause may be assumed as better known, and the *why* is not demonstrated. Thus it is demonstrated that the planets are near the earth, because they do not twinkle. Let C be the planets, B not twinkling, A being near. We may say B of C, for the planets do not twinkle. But we say also A of B, for when a body does not twinkle, it is near. We may suppose further, that this last proposition is furnished by induction or sensible experience (*δι' ἐπαγωγῆς ἢ δι' αἰσθησεως*); we conclude necessarily that A belongs to C, and in this way it has been demonstrated that the planets are near. But under this form the syllogism does not say why the thing is, it only says that it is; for

the planets are not near the earth because they do not twinkle, but, on the contrary, they do not twinkle because they are near. On the other hand, we may still demonstrate inversely the effect by the cause, and then the demonstration will give the *why* of the thing. Thus, whatever is near (B) does not twinkle (A): the planets (C) are near (B), therefore the planets (C) do not twinkle (A).—(*An. Post.*, i. 13.)

§ 24. The immediate successors of Aristotle seem to have restricted themselves wholly to the formal side of Logic, modifying details, and developing the theory of Hypothetical Reasoning. This was done chiefly by Theophrastus (taught from 322 to 286 B.C.) and Eudemus. The Stoics cultivated logic, though the doctrines of the school are only preserved in fragments. Chrysippus (280-208 B.C.) followed in the line of Theophrastus and Eudemus; but there was an attempt in the Stoical school to widen the scope of the science, so as to make it an instrument of real truth. Epicurus (d. 270 B.C.) regarded it as a canonic, and found the criterion of truth in sensation. With the quickening of speculation in Alexandria, attention was fixed on the logical writings of Aristotle. They gave the only form of methodical thinking known, and thus acquired great influence on the philosophical thought of the time. From the latter part of the second century to the beginning of the third, Alexander of Aphrodisias, so called from a city of Caria, his birthplace, was the greatest power in sustaining and spreading the influence of the logical treatises of Aristotle. His commentaries and expositions are admirable,—still unsurpassed; and he was a man, besides, of original faculty, as shown especially in his treatises on the *Soul* and on the *Fatalism of the Stoics*. In the Schools he was *the Commentator*, as Aristotle was *the Philosopher*. Alexander seems to have taught both at Athens and Alexandria. Galen, in the second century (131-200 A.D.) was not less famous as an expositor of Aristotle than as a physician. His logical writings have, however, perished, with the slight exception of the *περὶ τῶν κατὰ τὴν λέξιν σοφισμάτων*. The *Introduction to Dialectic*, discovered at Mount Athos, and published in Greek, 1844, is probably spurious. Plotinus (205-270 A.D.) assailed the *Categories*; and Porphyry (233-304 A.D.), his disciple, expounded them in his *Introduction*, so valuable as to have since been uniformly prefixed to the *Organon*. Themistius, who taught at Constantinople in

355, paraphrased the logical treatises. Ammonius Hermeiæ (after 485 A.D.), Simplicius, who was banished from the School by the decree of Justinian (529), have left valuable expositions of Aristotle. David the Armenian and John Philoponus (about 533) in Egypt, are to be added to the list of commentators.

§ 25. The contributions of the Latins to Logic are not of much value. After the taking of Athens by Sylla (84 B.C.), the writings of Aristotle were carried to Rome. There they were arranged and edited by Andronicus of Rhodes. We have notices of the doctrines in Cicero, and subsequently a series of abbreviators,—Appuleius (160 A.D.), the Pseudo-Augustine, and Marciianus Capella (c. 474 A.D.) Victorinus (c. 350) translated the *Εἰσαγωγή* of Porphyry. Boethius (470-524) was the only Roman logician of consequence. He translated a great part of the *Organon*, and contributed commentaries and discussions of his own. The chief importance of his writings arises from the circumstance that they were for long, in the absence of a knowledge of Greek, the means of making Aristotle known in the West.

§ 26. Even in the ages following the end of the Western Empire (476 A.D.) and during the irruption of the barbarians into Europe, the logical writings of Aristotle were never wholly without study. We have Isidore of Seville (d. 636 A.D.), Bede (673-735), John of Damascus (d. 754), Alcuin (736-804). The last named introduced the study of Logic into the Court of Charlemagne, and this and his other teaching determined the line of thinking in Europe down to the time of Abelard (1079-1142). In that period we have among the Greeks the name of Michael Psellus (1020-1100 or later); and following him Italus, Ephesius, Eustratius, and Leo Magentinus.

§ 27. With Abelard, the logic of Aristotle acquired a new and powerful place in philosophy and theology. Though but imperfectly acquainted even with the logical treatises of Aristotle, and ignorant of Greek, such was the force of his character, that he sought on the one hand to widen logic so as to be a method of real truth, and on the other to apply it to theology as the regulator and even judge of its coherence and content. His teaching at Paris was the most powerful factor in the European thought of the age. It marked the commencement of the spirit of modern inquiry, the piercing through the

forms of words and facing the reality of things. The questions of Nominalism and Realism are in another form chiefly the modern metaphysical questions. John of Salisbury (d. 1180), the disciple of Abelard, defended logic in his *Metalogicos*, and showed a knowledge of the whole of the logical treatises of Aristotle. Up to this period only certain of those treatises were known in Western Europe. Hence we have the designations of the *Old* and the *New Logics*. The result of the most recent investigations on this point seems to be, that, until nearly the middle of the twelfth century, the only logical writings of the ancients known in the middle ages were the *Categories* and *Interpretation* of Aristotle, as translated by Boethius; Porphyry's *Isagoge*, in the translation and commentary of Victorinus and Boethius, the works of Marcianus Capella, the *Principia Dialecticæ* of Augustine, the Pseudo-Augustine on the *Ten Categories*, and Cassiodorus, and certain of the writings of Boethius (cf. Ueberweg, *Logic*, § 21 *Hist. of Phil.*) The *Categories* and *Interpretation*, with the *Isagoge* of Porphyry, formed the *Logica Vetus*. The *Analytics*, *Topics*, and *Sophistical Elenchi* were as yet unknown, and when introduced about the middle of the twelfth century, constituted the *Logica Nova*.¹ These were known only in translations. It was not until after the taking of Constantinople by the Crusaders, in 1204, that the Greek texts were obtained. The *Logica Nova* must not, however, be confounded with the *Logica Moderna* or *Tractatus Modernorum*. This arose from the *Summulæ Logicales* of Petrus Hispanus, who died as Pope John XXI. in 1277. The *Summulæ* consist of seven *Tractatus*. The seventh is entitled *De Terminorum Proprietatibus*, called also *Parva Logicalia*, and is mainly grammatical, developing, among other things, the doctrine of *Suppositio*. This was the specific doctrine of the *Moderns* and of *Modern Logic*. In this work of Hispanus appear for the first time the well-known mnemonic lines *Barbara, Celarent*, &c. That they are original to Hispanus, or at least were first given in the *Summulæ*, there can be now no doubt. For it is now certain that the *Synopsis Organi* attributed by Ehinger to Michael Psellus (the younger) was not by him at all, but was simply a translation into Greek of the work of Hispanus (see Hamilton, *Discussions*,

¹ See *Questiones Magistri Johannis Versoris in Totam Novam Logicam*, Cologne, 1497.

p. 128 and 671; cf. Ueberweg, *Logic*, § 22; *Hist. of Philosophy*, i. p. 404; Saint Hilaire, *De La Logique d'Aristote*, ii. p. 160, on the other side). The rough version of the mnemonic lines, given on the margin of the *Epitome Logicæ* of Blemmides, is obviously a copy of the Latin of Hispanus.

§ 28. It was not until towards the end of the twelfth century that the other works of Aristotle were introduced into Western Europe. This was due to intercourse with the Arabians, mainly through the Crusades. The Arabians had been for centuries diligent students of Aristotle. Alkendi (fl. 800), Alfarabi (d. 954), Avicenna (980-1036), Alghazel (1072-1109), Averroës (d. 1206 or 1217), were all distinguished names in this line. Averroës translated and commented on the whole logic of Aristotle, and divided with Alexander Aphrodisiensis the title of the Commentator.

In the reign and by order of the Caliph *Abdallah al Mamon*, about 819 A.D., the works of Aristotle were for the first time translated into Syriac by *Joannah Mesnach*, Christian of the sect of the Nestorians. They were translated a second time into the same language by Honaïn and his son Isaac, who also professed the doctrines of the Nestorians, and lived at Bagdad in the beginning of the tenth century. After them came the Arabian translators and commentators,—a school of Dialectic, frequently mentioned by Moses Maimonides and the other Spanish rabbis under the name of *Medabrim*, *speakers*, *dialecticians*. The matter of their teaching was the *Organon*, with the Introduction of Porphyry. The Jews translated into Hebrew the lessons of their Arabian masters. Maimonides wrote an abridgment of the *Organon* in Hebrew, very precise and clear, under the title of *Vocabulary of Logic*. This was translated in 1527 into Latin by Sebastian Munster. Another Hebrew translation of the *Organon* is—*Hebraica editio universæ rei logicæ Aristotelis ex compendiis Averrois, Rivæ de Trento, anno MDLX.*—(Cf. Franck, *Logique*, p. 248, and Jourdain, *Sur Aristote*, c. iii.)

The Arabians brought their learning, with the Aristotelic works and commentaries, into Spain; and their doctrine flourished in the Universities of Cordova, Seville, and Grenada. Amid the differences of religious belief, there was thus formed between Mohammedan and Christian the bond of a common philosophic culture and faith.

§ 29. It was from this importation into Western Europe of the Aristotelic books that Scholasticism took its rise and impulse; and henceforward, with the temporary check of the burning of the non-logical works of Aristotle in Paris in 1210, in accordance with the demand of the Papal Envoy, Aristotle reigned supreme in Europe, as logician and philosopher, the Master of Human Thought,—his works “The Evangel of Intelligence,”—until the gradual decay of his empire through the Renaissance, the foundation of Modern Method by Bacon and Descartes, and the Reformation. Albertus Magnus (1193 or 1205-1280), in full possession of the Aristotelic works, and with a thorough mastery of them, as shown in his commentaries, was the man who, by his writings and teachings in the University of Paris, then the centre of intellectual influence in Europe, laid the foundations of the Aristotelic empire, which, lasting for four centuries, moulded the European mind and languages, united the nations of Europe in common intellectual conceptions,—formed, in fact, modern intelligence on its side of clearness, distinctness, and connectedness. For true it is that the moulds even of that science and of that thought which repudiate Aristotle are his creation. “The dialectic,” says St Hilaire, “which presided over the infancy of the European sciences, has permeated our entire civilisation. The logic of Aristotle, though dead in the schools, lives in the general thought which it has so greatly contributed to form and to instruct.”

§ 30. The scholastic study of logic, and, in most cases, the application of logic to theology, were carried on through Thomas Aquinas (1224-1274), Nicephorus Blemmides (fl. 1254), Duns Scotus (1275-1308), Walter Burleigh (1275-1337), Petrus Hispanus (Pope John XXI., d. 1277), Georgius Pachymeres (d. about 1310), William of Occam (d. 1343 or 1347), John Buridanus (alive in 1358), Cardinal Bessarion (1395-1472), George of Trebisonde (1395-1486), Laurentius Valla (1408-1457), Rodolf Agricola (1443-1485). In the critical period of the Renaissance we have Ludovicus Vives (1492-1540), Peter Ramus (1515-1572), James Zabarella (1532-1589).

§ 31. The criticism of the Renaissance was the prelude to a period of violent, and not particularly discriminate, attack on Aristotle. The new philosophic spirit, and the

Reformation movement, were hostile to his authority; the mystics of the time were likewise opposed to his definiteness of form; he was attacked by Vives, Ramus, Gassendi, Gerson, Nizzoli, Patrizzi, and Luther; then by Bacon, and virtually by Descartes. But in the end, and very shortly, it was found that the method and discipline of the logical treatises could not be dispensed with by any school or sect, philosophical or theological; and all the essentials of the logical theory were readopted by the followers of those who had assailed it.

§ 32. There were two things which led to the passionate revolt against the Aristotelic logic in the sixteenth and seventeenth centuries. The one was the misapplication of its laws, to some extent at least, as if aiming at positive truth or science; the other was the speculative misapprehension of its nature on the part of several reformers, not excluding even Bacon and Locke, as a method of real truth, whereas it but showed the forms. The methods of Bacon and Descartes had totally different aims from those of the Aristotelic logic; yet these are complementary, not opposed. The necessity of recurring to the school logic was shown very shortly after the first impulse of Bacon and Descartes had spent itself. Hobbes gave us a logic; the school of Descartes did the same in the Port Royal Logic of Arnauld; the Reformation gave us the logics of Melancthon, Derodon, and Goveanus,—all essentially Aristotelian. Kant himself only touched logic to recognise that Aristotle had created a science which, in his view, had neither advanced nor receded for twenty-two centuries. All this clearly shows what is apparent, from the nature of the case itself, that a logic of form and formal method is an indispensable need of intelligence, and that the attempted substitution by Bacon of Induction for Syllogism proceeded on a misconception of the province of the latter and its place in the sphere of human knowledge. It might further be very readily shown that Aristotle had a sufficiently accurate conception of Induction as a real method.

The exception of the logical treatises of Aristotle from the flames in Paris in 1210 is, as has been remarked, characteristic of the history of those books themselves. While his other writings have been repudiated or partly superseded, the logical treatises cannot reasonably be either cast aside

or neglected. They are of universal truth and application. They are indispensable to different nationalities and to varying faiths. The Induction of Bacon and the Analytic Reflection of Descartes alike need them. Modern science, in the person of certain of its followers, is supercilious enough about them. This only shows that these people do not know their own origin, or appreciate their own needs. They act as scientifically in this as if they were to condemn the study of grammar, because certain people have accidentally learned to speak grammatically without it. Empirical accomplishment is not a thing which modern science can consistently, with its character or pretensions, afford to applaud or exalt above methodical culture.

§ 33. In the seventeenth century, the logic of Burgersdyk (*Institutionum Logicarum Libri Duo*, 1626), especially with Heereboord's annotations (d. 1659), is very valuable (*Ermenia Logica*, 1666). The influence of Descartes is recognised in the logics of Clauberg (1625-1665), the Port Royal (of Antony Arnauld, d. 1694). We find Leibnitz (1646-1716) returning to precise views of the nature and laws of formal Logic, and these were systematically developed by Christian Wolf (b. 1679).

The logicians of the eighteenth century on the Continent worthy of note are Lecierc (d. 1735), after Looke; Crousaz (d. 1748), after Leclerc; Ploucquet (d. 1790); Wytttenbach (d. 1820).

The short treatise of Kant on *Logik* first laid down precisely the lines of the science, as a body of formal doctrine, in the terms since accepted in modern philosophy.

§ 34. The logicians of the Kantian school, more immediately related to Kant himself, are Jacob, Kiesewetter, Hoffbauer, Maass, Krug, E. Reinhold, Twesten, Bachmann, F. Fischer. Fries and Herbart follow the same line, with important independent investigations and contributions to the science; and connected with Herbart are Drobisch, Hartenstein, Waitz, Allihn.—(See Ueberweg, § 29, p. 60.)

§ 35. Since the time of Kant, in Germany, Fichte and Schelling have done nothing in formal logic. Hegel recognised the value of the Aristotelic treatises, and gave a certain impulse to the study of them. But, as has been said of his own Logic, it has nothing in common with Aristotle but

the name. It is an ontology, to be criticised on its own assumptions and method. Hegel has discussed Logic in the *Wissenschaft der Logik*, 1812-16, 2d ed. 1833-34, and in the *Encyclopädie der philosophischen Wissenschaften im Grundrisse*, 1817, Part I., §§ 19-244. There are three main points in Hegel's view, as Ueberweg has thus succinctly put them:—

"1°. He identifies the form and the most general content of thought—i.e., what is regarded as logical with what is held to be metaphysical. But even supposing these to be essentially connected, they cannot be identified; and, besides, their proper scientific treatment demands two distinct sciences or departments of philosophy. The discussions on Being and Essence have no proper place in Logic.

"2°. Hegel identifies the forms of thought with the forms of existence, and regards the Notion, Judgment, and Inference as of metaphysical or objective significance. 'The notion is immanent in things, things judge and infer, the planetary system, the state, everything in accordance with reason is an inference.' There is in this simply an absence alike of scientific and philosophical precision. The mind conceives, judges, infers. Things do not,—they only show analogies and correlations with these processes. They are like but not the same." To be trained to think in a rut of this sort is, as Fechner justly puts it, "to unlearn thinking."

"3°. The dialectic method sets before it a false problem, and solves it only apparently. (a) Pure thinking,—thinking that does not depend on and relate to experience, to the matter of outer and inner perception,—thinking in itself,—cannot produce human knowledge. This arises from the action of thinking on the material of outer and inner perception. It is this knowledge which Logic considers, not the (so-called) working of thought *in vacuo*. (b) Further, the more abstract and extensive notion cannot produce in the thinking subject the more concrete and comprehensive. 'The product,' says Beneke, 'cannot contain more than what the factors have given.' (c) The logical categories, as transferred to reality, are hypostatised and treated as independent essences, which are capable of a peculiar development, and of passing over the one into the other. The outgoing in the objective reality from Being to Nothing, and then to Becoming, and so on to the Absolute Idea, is given as a timeless *prius* in the

development of nature and spirit. But such an outgoing is utterly unthinkable."—(Ueberweg, § 31, p. 68.)

The chief logicians of the Hegelian school are Erdmann, Rosenkrantz, Kuno Fischer. The chief critics of the Hegelian logic are I. H. Fichte, Schelling, Trendelenburg, Kym, Lotze, Chalybäus, George, Ulrici, Von Hartmann, Herbart and his school.—(Cf. Ueberweg, § 31, 32.)

§ 36. Schleiermacher (*Dialektik*, 1839) adopts the conception which makes the forms of thinking and knowing parallel, while not identical, with the forms of real existence. The notion and judgment correspond respectively to substantial forms and to actions. He denies Hegel's doctrine that "pure thinking" has a character or beginning distinct from all other thinking, ordinary or reflective, and can arise specially for itself. He properly makes human thought dependent on perception. There can be no act of knowledge apart from two functions,—the "intellectual" and the "organic." H. Ritter, Vorländer, Beneke, Dressler, Trendelenburg, Hoffmann, Lotze, Braniss, are all more or less related to Schleiermacher.—(Cf. Ueberweg, § 33.)

Occupying a position intermediate between the Kantian and Hegelian views of Logic are I. H. Fichte, Balzano, Chalybäus, H. Ulrici, Katzenberger, Sengler, Friedrich, Von Kirchmann, Seydel, and others.

In the Aristotelian line, yet with modern reference, are Hagemann, Rabus, Hoppe (Ueberweg, § 34, p. 72 *et seq.*)

§ 37. In France, during the eighteenth century, formal logic was neglected, even despised. In the present century, Cousin drew attention to it and its place in philosophy; and to his influence we may attribute the valuable and learned works of B. St Hilaire on the *Organon of Aristotle*,—*De la Logique d'Aristote*, 2 tomes (1838), and his *Logique d'Aristote traduite en Français* (1844), 4 tomes, and also Franck's *Esquisse d'une Histoire de la Logique* (1838). Vacherot, Tissot, Duhamel, Waddington, Duval-Jouve, Pellissier, Delboeuf, are the chief recent French logicians.¹

§ 38. From the middle of last century down to a date well past the first quarter of the present, the important branches of Logic, Deductive and Inductive, especially the former,

¹ See especially Raiffenberg, *Principes de Logique* (Bruxelles, 1833), p. 239, for a *Précis de l'Histoire de la Logique*, and p. 350, for *Bibliothèque*.

were imperfectly treated in the Scottish Universities, and hence in Scotland itself. The Experimental Method of inquiry, as it was called, which, through the precept of Bacon and the practice of Newton, had become dominant in Britain, powerfully affected the habits of thought in last century in Scotland. Its results were so great and brilliant, and its promise so high, that there was an unreasoning reaction against Deductive Logic, whereas all that really deserved censure was its wearisome and fruitless application in books to abstract terms and definitions. From 1453 up to the end of the seventeenth century there had been a tolerably continuous course of instruction in the Aristotelic logic in the University of Glasgow. What John Major had taught, even Andrew Melville resumed and continued. The lingering influence of this is seen in the teaching, but especially in the text-books on Logic, of Gershom Carmichael (1672-1729), and Francis Hutcheson (1694-1746). Carmichael's treatise is entitled *Breviuscula Introductio ad Logicam* (1722); that of his successor Hutcheson, *Logicæ Compendium. Præfixa est Dissertatio de Philosophiæ Origine, ejusque inventoribus aut excultoribus præcipuis* (ed. 1759-1764).

Both treatises show an acquaintance with the Aristotelic writings, accuracy and precision in the definition of terms, and both bear traces of the advance of new doctrines on the older stereotyped formulæ, probably mainly suggested by the Port Royalists. We have in them distinctions set forth which were subsequently lost sight of, and only revived and scientifically applied in our own time,—such as the discrimination of Extension and Comprehension in notions, of Immediate and Mediate Judgment involving Reasoning, and of Immediate Judgments as abstract and concrete. Hutcheson distinguishes with precision Sensation, Imagination, and Pure Intellection (*Pars I. c. 1.*) Both treatises contain valuable rules of Deductive Logic. *The Elements of Logic* of William Duncan of Aberdeen are of but slight relevancy and value. Even Dr Thomas Reid could speak of the syllogistic art “as a mechanical mode of reasoning, by which in all cases truth and falsehood might be accurately distinguished,”¹ though he left us a very intelligent abridgment of the *Organon*;²

¹ *Statistical Account of the University of Glasgow, Works*, p. 736.

² *Works*, p. 763.

and there is now evidence that in his teaching at Aberdeen he gave considerable importance to Logic.

(a) In a MS. volume in my possession there is a short compend of 101 pages, entitled 'A System of Logic taught at Aberdeen, 1763, by Dr Thomas Reid, now Professor of Moral Philosophy at Glasgow.' This is obviously made up of notes of lectures given by Reid. It is full and clear, and gives a very good view of Reid's opinions on Logic. Reid refers under Simple Apprehension to the Predicaments and Predicables, criticises Locke and Hume, deals with Judgment, Belief, Evidence, Induction, and Method. (The part on Reasoning is not given by the transcriber, on the ground that it contained nothing new.) These lectures, in fact, contain the germ of the most important of the new views of Reid, afterwards more fully developed in the *Essays on the Intellectual Powers*.

§ 39. Dugald Stewart echoes the crudities of Locke on the subject of Deductive Logic, and seldom loses an opportunity of speaking disparagingly of "the logic of the Schools." Owing to a current of opinion of this sort, Logic as a science and organic branch of Mental Philosophy ceased to be studied in the Universities of Scotland. It was treated in a cursory manner as an intellectual curiosity which had enjoyed the attention of men in "the dark ages," but which must give way to new and fresh studies conducted by the advanced intellects of the time.¹ The increase of the material of knowledge was regarded as all-important. It was forgot that the science of method and form,—of the processes of the acquisition and concatenation of knowledge,—cannot be set aside without a disregard of the completeness and symmetry of knowledge itself; that the assumptions of the scientific processes need vindication; that the processes and their results need rules of purification, testing, and verification; and that Logic which deals with those points is not rendered superfluous, but only widened by the opening up of new spheres of inquiry and science.

§ 40. It was not until Hamilton fully and lucidly set forth the true character and place of Formal Logic as a department of Mental Philosophy, in a contribution to the *Edinburgh Review* of 1833, that the study recovered its true position in Scotland and in the Scottish Universities. Of the influence of this remarkable essay, we could not have a better

¹ There is a very meagre compend by Professor Jardine, *Quædam ex Logica Compendiis Selectæ*.

illustration and evidence than in the *Elements of Logic* of the late Professor Spalding of St Andrews (1857), one of the ablest of our modern logics, and one which shows the high tone of teaching in that ancient though small University from 1845 to 1860, the recovery in fact of its mediæval prestige. From 1836 to 1856, the period during which Hamilton occupied the chair of Logic in the University of Edinburgh, he developed in his lectures the science of formal logic, with a fulness, precision, and learning wholly new to Scotland, even to Britain. These lectures, published, after his death, in 1860, represent the Aristotelic doctrines, the Kantian point of view and some of its subsequent modifications, and, in part, the author's own new logical development.

§ 41. One of the earliest treatises which aimed at extending a knowledge of Hamilton's logical system beyond the class-room, was an *Essay on the new Analytic of Logical Forms*, by Thomas Spencer Baynes (1850), now Professor of Logic in St Andrews. Mr Baynes is also the author of an excellent *Translation of the Logic of Port Royal* (1850).

§ 42. The same influence which acted in Scotland extended to Oxford, and freshened the faded dialectic of that University, as represented by the meagre and inaccurate compend of Aldrich; for the *Outline of the Necessary Laws of Thought*, by William Thomson of Queen's (1842), now Archbishop of York, and the able, learned, and valuable logical writings of the late Dean Mansel are, with much that is distinctively original, especially in the latter, the almost direct inspiration of Hamilton. We have to thank Oxford for Whately's *Elements of Logic* (1826), as one of the most useful and practical books on the subject which we yet have; but Oxford has had to look to Scotland, rather than to its own Oriel, for a systematic development of the science, and for the learning needed to correct errors in its nomenclature and history.

The most recent additions to the literature of Logic in Scotland are by Professor Bain of Aberdeen, who has given us two important treatises on Inductive and on Deductive Logic. His Deductive Logic is marked by Mr Mill's peculiar view of the syllogism, which need not at present be discussed. It is curious and interesting to find that one who may be regarded as the most eminent of the school of Locke

in Scotland in our time, has written valuable works on that department of philosophy which Locke himself so greatly misunderstood and contemned.

Since the date of Hamilton's essay in 1833, and with it the rise of an accurate view of the province of formal logic, the revival in Britain of logical studies, deductive as well as inductive, has been very remarkable. In Deductive Logic, we have had the treatises of De Morgan, Boole, and Jevons. Other writers in the department are Maccosh, Kidd, Morell, Karslake, Milnes, Swinbourne, Abbott, Monck, W. G. Davies, Alfred Sidgwick, Fowler, Stebbing, Hughlings, Poste, Venn, Lindsay, and Bradley. The abridgment of Hamilton by Bowen of Harvard is well worthy of notice and study.

One important function of this branch of literature is that it serves to preserve the balance and the symmetry of human knowledge, aids reflective thought, gives us a width of vision over the realm of science, otherwise unattainable, and thus helps to save us in a measure from the besetting sin of modern intellectual habit, blinding specialism.

CHAPTER IV.

TRUTH, AND THE RELATIONS THERETO OF LOGIC—DEFINITION
OF LOGIC.

§ 43. While Truth in general may be regarded as a harmony or conformity between thought and reality, or more precisely, between thought as representative and fact as given in intuition or presented, it is to be observed that the consciousness of truth as a mental act implies a synthesis, or composition of notions or terms as one, or better as in one.¹

So long as notions or terms are in the mind apart from this synthesis, we have not properly either truth or error. And this applies equally to nouns and verbs,—for the verb, apart from its relation to time or assertion, is essentially an attribute or noun. Notions out of combination, and combination as one, are merely representations devoid of truth or error. The notion, for example, of *goat-stag* (τραγέλαφος) may be in the mind, but it is neither true nor the reverse, until it is added that it is, or is not, either absolutely or in some determinate time.²

A sentence even may be significant without being properly either true or false, as in the case of the expression of a prayer or wish. The sentence which admits of truth or error must be enunciative (ἀποφατικός),—represent two notions or terms as in or not in one and the same subject,—in other words, affirm or deny.³ There is the assertion of a relation of identity or congruity, or the denial of this, between the notion or term spoken of, and that which is

¹ Συνθεσις τῆς ἡδὲ νοήματος ὡς περ ἐν ὄντων.

² Cf. Aristotle, *De Int.*, c. i.

³ *De Int.* c. iv.

spoken of it. This synthesis of thought is expressed in that form of words into which the verb enters, as *Water cleanses—man is organised*.

§ 44. It may be a question as to whether, and in what sense, concepts by themselves are true or erroneous. If concepts be regarded as representative of reality or things,—and such is their essential character,—then they may be correct or incorrect representations. *Man, animal, organised*, are concepts; each contains a series of attributes, and they have a relation to objects considered as possessing those attributes. So all scientific concepts,—*chemical affinity, gravitation, &c.* If they represent the attributes in the objects of the class correctly, they are true; if incorrectly or imperfectly, they are false or inadequate. This, however, may be regarded as a potential truth or error. Until the concept is declared adequate to the object of the class, or until the attributes of a concept are actually referred to the subject, they have but an ideal reality, and cannot be said to be actually true or the reverse. Synthesis, composition, the regarding as one of a plurality,—the object and concept, the subject and attribute,—is essential to truth,—in other words, there is need of actual predication. The point to be kept in view regarding the concept is, that it is not a mere work of framing or fiction at the arbitrary pleasure of the mind, but determined and constituted by and in accordance with the nature of things. As Aristotle well puts it, referring, however, actually to enunciation, expressions are similarly true as things—*Ὅμοιως οἱ λόγοι ἑληθεῖς ὥσπερ τὰ πράγματα*.—(*De Int.*, c. ix.)

(a) The name of truth has been improperly given “to the mere reality of existence, altogether abstracted from any conception or judgment relative to it, in any intelligence human or divine. In this sense *physical truth* has been used to denote the actual existence of a thing. Some have given the name of *metaphysical truth* to the congruence of the thing with its idea in the mind of the Creator. Others again have bestowed the name of *metaphysical truth* on the mere logical possibility of being thought; while they have denominated by *logical truth* the metaphysical or physical correspondence of thought with its objects. Finally, the term *moral* or *ethical truth* has been given to veracity, or the correspondence of thought with its expression.”—(Hamilton, *Logic*, L. xxvii.)

(b) He judges truly who thinks that what is divided is divided, and what is combined is combined; but falsely who thinks contrarily

to things as they are.—(*Met.* ix. 10.) In other words, truth is not the mere licence of thought, but lies in the act of thought, which is conformed to the nature or reality of things. Truth in modern language is defined as the harmony of thought with the thing itself, or of the subjective with the objective.—(Cf. Trendelenburg *in loco*.)

A true sentence is by no means the cause of a thing's existence, but in some way the thing appears the cause of the sentence being true, for in consequence of a thing existing, or not existing, is a sentence said to be true or false.—(*Cat.* xii.)

It is the combination of our thoughts which gives us truth or error, but the reality which serves as their basis is absolutely independent of human thought.—(*De Anima*, iii. 8, 432a, 11. Cf. *Ibid.* 6, 430b, 1.)

As Bacon puts it: "Scientia nihil aliud est quam veritatis imago; nam veritas essendi et veritas cognoscendi idem sunt, nec plus a se invicem differunt, quam radius directus et radius reflexus."—(*N. O.*, I. Aph. xiii.)

§ 45. Formal Logic, though concerned with truth, does not consider all the laws, conditions, and methods through which we are to reach the harmony of thought and reality,—the principles, in particular, of observation, classification, generalisation, induction of causes. At the same time, it is not to be regarded as divorced from the conditions of our knowledge of the real. The laws with which it deals relate to the form and very possibility of our knowledge, and essentially to the connection and development of our knowledge. They are laws of the ideal possibility of an object of thought, of the consistency of our objects of thought, and of the necessary connections of the matter of our thought. Logic, as it has been defined, is "the science of the laws of thought as thought."¹ Other equivalent expressions are "the science of the formal laws of thought," "of the laws of the form of thought,"² "of the necessary form of thought."³

These expressions, when fully explicated, bring out the essential character of Formal or Deductive Logic. For they can be shown to contain the points (1) of the ideal possibility of any object of thought, (2) the consistency of attributes in an object, (3) the necessary implication of one judgment in another, whether as in immediate inference or as in reasoning.

(a) By some writers Logic is defined simply as the Science of Reasoning. This is inaccurate. It is the Science of Thought in its three forms of Conception, Judgment, and Reasoning. These are all equally forms of the same fundamental power,—that of Comparison.

¹ Hamilton, *Logic*, L. i. par. 1.

² *Ibid.*, L. i.

³ *Ibid.*, L. iii.

They are essentially related; no adequate theory of reasoning can be given without a previous consideration of conception and judgment. Farther, the laws which regulate reasoning are already exemplified in conception and judgment. This mistake of limiting Logic to the theory of Reasoning was long ago corrected by intelligent logicians, as Smiglecius, who maintains that neither Argumentation, as held by Albertus, nor Syllogism, as by Sextus, nor Demonstration, as by the Greeks, is the adequate object of Logic, but that this is found in the three operations of the mind in as far as they are dirigible—*qua dirigibiles*, or capable of direction to an end. Dirigibility belongs to the operation as such; and through this quality only, through the abstract laws and forms of the operations, can Logic be said to embrace all things.—(Smiglecius, *Logice Disp.*, ii. 9. 1.)

(b) This definition of Hamilton is related to the view of Kant as to the sphere of Logic: Kant's view of General Formal Logic is that it is the rational science of the necessary laws of thought, as these refer to all objects generally, or all objects whatever. It is the science of the pure form of thought. This science is divided into Pure and Applied. Pure considers the Understanding in itself; Applied deals with the Understanding in its conjunction with the other faculties. Pure General Logic is divided into the Doctrine of Elements and the Doctrine of Method. Special Logic treats of the special methods of the particular sciences.—(Cf. *Logik*, and Ueberweg, § 28.)

Kant's full conception of Logic is as follows:—

"Logic is a rational science, not only in respect of mere form, but also of matter; a science *a priori* of the necessary laws of thought, not by relation to particular objects, but by relation to all objects in general: it is, consequently, the science of the legitimate use of the Understanding and the Reason in general; science not subjective, that is to say, executed not according to empirical principles (psychological), but science objective, that is to say, made after principles *a priori* determining the manner in which the understanding ought to think.

"If we make abstraction of all knowledge which we can acquire only on occasion of objects, and reflect only on the use of the understanding in general, then we shall discover those rules which are absolutely necessary under all relations, and without any regard to the particular objects of thought, because that without them there would be no thought. These rules may thus be considered *a priori*, that is, independently of all experience, because they contain simply, without distinction of objects, the conditions of the exercise of the understanding in general, whether it be *pure* or *experimental*. Whence it follows at the same time that the general and necessary rules of thought can concern only the *form*, and not the *matter*. The science of these necessary and universal rules is therefore simply the science of the form of our intellectual knowledge or thought. We can thus frame the idea of the possibility of such a science, in the same way as we form the idea of a General Grammar. This contains but the simple form of language in general, and not the words which constitute the matter of languages.

"This science of the necessary laws of the Understanding and of Reason in general, or which is the same thing, of the simple form of thought in general, is that which we call Logic."—(*Logik*, Intro., § 1.)

§ 46. Esser's argument, adopted by Hamilton, for the formal character of Logic is in substance that, if the science were to take account of the matter or objects regarded as realities, it must either consider all cogitable objects, or some only. If the former, it would be the one universal science, an impossible science. If the latter—if it were to take cognisance of certain objects only on their real side,—it would do so arbitrarily, or without ground of selection. This would not be a scientific procedure. Logic has thus no immediate concern with that which is thought about. It is thus a science of the form of thought.¹

(a) No one has put this more clearly than Occam. Logic, he says, is a rational science, dealing with those objects which cannot be without reason,—not real, which refers to things existing apart from the mind. Whether man be *species*, *rational difference*, *whence* an accident, cannot be determined by logic, because these points cannot be known apart from a perfect knowledge of the nature of the thing signified by the subject. There would thus be no perfect science of logic, unless the logician knew the nature of all things—nay, unless he knew all the conclusions and all the principles of all the sciences. Such propositions are only pertinent to logic as a science, in the way of examples.—(*Expos. sur Procem.* and *Summa totius Logice*, iii. 2, 22, f. 53. Prantl., *Ges. d. Logik*, iii. 744.) He also tells us that Logic is practical, inasmuch as it directs the intentions of the mind, which are our own acts, such as judging and reasoning, and not external things, unless in a secondary way, which are beyond our power.—(*Expos. sur Procem.* Prantl., iii. 742.) The part of logic which deals with the categories is speculative, inasmuch as their objects are not our operations.—(*Præd. Procem.* Prantl., iii. 743.)

Whether terms, propositions, syllogisms, which we make, exist only subjectively in the mind, or in some other manner, belongs not to logic to consider, but to metaphysics.—(Occam, *Expos. Am. Procem.* Prantl., iii. 756.)

Again: It is incorrect to allege that some definition of man is logical, some natural, some metaphysical, because the logician, since he does not treat of things which are not signs, does not treat of man nor has to define man, but has to teach in what mode other sciences treating of man have to define him. The logician, therefore, ought to assign no definition of man, except by way of example.—(*Log.*, i. 26.)

(b) It was a question with the earlier schoolmen whether logic was of things, or concepts, or words (*de rebus aut de conceptibus aut de*

¹ *Logik*, L. i.

vocibus). On this point, the more intelligent followed Avicenna (980-1037), who held that the object of logic was concepts, but concepts of the second intention applied to first (*intentiones intellectæ secundo, quæ apponuntur intentionibus primo intellectis*).—(*In Metaph.*, i. 2, f. 70, v. A. Prantl., ii. xvi. 74).

Intentio, or *intentio animæ*, is equivalent to *ens in anima*, *conceptus animæ*, *passio animæ*, *similitudo rei*. Out of intentions is formed the mental proposition (*propositio mentalis*). In the widest sense of the term, it is that in the mind which is a sign naturally signifying something for which it can stand, or be substituted. — (Occam, *Log.*, i. c. 12.)

In the stricter sense of the term, the first intention, or a concept of the first intention, is a concept immediately abstracted from things; a concept of the second intention is a concept abstracted from the first concept, or from first concepts. For the names of things existing beyond the mind are of the first intention, as *man*; but concepts abstracted from these are signified by names of the second intention, as *genus*, *species*, *subject*, *predicate*, or, as Occam elsewhere puts it, strictly speaking, the first intention is the mental name produced to stand for its significate; the second intention is the sign of such first intention. As *man*, a first intention, is predicable of all men, so one common intention, as *genus*, is predicable of several first intentions, *animal*, *stone*, *colour* (*Log.*, i. 12). *Logic is of things of the second intention as they are of the second intention*, because in logic nothing is determined concerning things or words unless by relation to second intentions (*per habitudinem ad intentiones secundas*). *Eus rationis* is identical with second intention.—(*Expositio*, s., *Act. Vet.*, f. i. v. A. Prantl., iii. 579.) The definition here given of Logic, as *de rebus secundæ intentionis, ut sunt secundæ intentiones*, is even in its terms equivalent to the definition as “the science of thought as thought,” or the science of the form of thought. *Intentionalis, intentionalitas*, may be translated by *formal* and *formality*.

Intention, says another schoolman, is the same as concept. The concept of the first order or intention is that which the intellect forms about things while not reflecting upon its own concepts; second intentions are concepts of the second order, which the intellect forms by reflecting and returning upon its first concepts. All those intentions of this sort are in the category of relation. Universality is a universal relation to the particular, and particularity is similarly to the universal, and affirmation and negation are relations, relations of extremes,—(*Petrus Aureolus, Sent. I.*, Dist. 23, art. 2, p. 539 A. Prantl., iii. 322.) Syllogism always indicates relation, and it may be alleged that the syllogism is expressed relatively to the conclusion.—(P. 541 A.)

(c) The older logicians came very near the definition of the text, even in words. Thus Smiglecius (*Log. Disp.*, xii. p. 451, ed. Oxon. 1658) tells us that the term, both subject and predicate, is the matter of the proposition (*materia propositionis*), but the formal mode (*ratio*) of predication is in the verb. The term is the material predicate, the verb the formal, because it is predication itself.

Albertus Magnus says that because he speaks of the simple syllogism,

which is only formally syllogism, and holds in every matter, and is peculiar to no matter, he uses transcendent terms signifying nothing and all.—(*Anal. Pr.*, i. 9, p. 298 A. Prantl., iii. xix. p. 106.)

§ 47. The actual inseparability of the form and matter is no argument against the abstract consideration of the former by Logic. In this, Logic demands nothing which must not be conceded to science in general. Extension and Colour are actually inseparable; yet Mathematics considers the former apart from any regard to the latter. Each diagram drawn and imagined must be coloured, and this in no way affects the mathematical process or proof. So it is with the logical consideration of form apart from matter.¹

§ 48. It follows from the formal character of Logic that it is not an *organon* of science,—that is, an instrument for the discovery by observation, generalisation, induction, of facts and general laws. Logic can but form part of a science; it cannot anticipate its matter—i.e., any fact in it. It does not extend knowledge, but seeks merely to put what we know in accord with the forms of the understanding.² Its main functions in relation to knowledge are to preserve self-consistency, and to secure necessary evolution. We can thus determine precisely in what sense Logic is an organon or instrument of science. Formally, one science is the organon of another, when it determines the scientific form of another. As it appertains to Logic to consider the general doctrine of Method and of systematic construction, Logic is to the sciences an instrument, but only a formal instrument.³ An extension of any science through Logic is absolutely impossible. By conforming to logical canons we acquire no knowledge, but are enabled to render what is already obtained more intelligible, by analysis and arrangement. The logical laws do not amplify science more than the grammatical laws of a language discover to us what is written in the language, without a perusal of the several writings themselves.⁴

§ 49. But while not an instrument of science, it is a canonic of thought and science.⁵ As containing the necessary and universal laws, the violation of which renders the proper exercise of the understanding impossible—that is, when thoroughly

¹ Hamilton, *Logic*, L. ii.

² *Logic*, L. ii.

³ So called by Epicurus, and adopted by Kant.

² Cf. Kant, *Logik*, Int.

⁴ *Ibid.*, L. iii.

analysed, the exercise of the understanding at all,—it is a legislative science in the highest sense. Any so-called thought,—be it a concept, a judgment, or a reasoning,—which violates the form of the Understanding, ceases to be,—becomes, in a word, nonsensical and merely verbal.

This is shown in detail, with the strictness of demonstration, by the application of the rules of logical science to the various products of the understanding—Notion, Judgment, Reasoning. These special rules strictly form the fundamental laws of thinking, and partake of a demonstrative character. The special rules of Reasoning, for example, are but tests of validity which, resting ultimately on the character and number of the primary laws of thinking, are deducible from them.

(a) On this head, Kant says that, as canon of the understanding, Logic can borrow nothing from another science, or from experience. It must contain only the pure *a priori* laws, which are necessary, and which are the heritage of the understanding in general. This language is misleading and exaggerated. Along with other expressions of the same sort, it has led to the delusion that there is “a rational science,” or science of abstractions; and this has been employed to supersede—even abolish—the reality from which the abstraction was taken, and which alone gave it meaning. Logic is, in a sense, an abstraction from experience, and can be nothing else. It is the science of what is necessary in experience, and, therefore, universal. Our means of knowing and testing the necessity of its laws are found in experimenting on particular instances. The strength of the particular thought which embodies truly a law is as great as the strength of the abstract law itself; it is only not so extensive as the law.

(b) “Ratio de suo actu rationari potest . . . et hæc est ars logica, id est rationalis scientia, quæ non solum rationalis est ex hoc quod est secundum rationem, quod est omnibus artibus commune, sed etiam in hoc quod est circa ipsam artem rationis sicut circa propriam materiam.”—(St Thomas, quoted by St Hilaire, i. p. 24.)

“Logica enim est omnium artium aptissimum instrumentum, sine qua nulla scientia perfecte haberi potest; quæ non more materialium instrumentorum usu crebro consumitur, sed per cujuslibet alterius artis vel scientiæ studiosum exercitium continuum recipit incrementum.”—(Occam, *Proæm. Sum. t. Log.*)

CHAPTER V.

OBJECTIONS TO LOGIC AS A FORMAL SCIENCE—THE VIEWS OF KANT, HEGEL, AND UEBERWEG.

§ 50. If Logic be, as Kant puts it, the rational science of the necessary laws of thought, and as these have to do not with particular objects, but with all objects generally, this science cannot be said to be subjectively formal, or to be divorced from any relation to objects, even real objects. On the contrary, it embraces the most general aspects of objects as these are actually and possibly cognised and cognisable by us. These aspects, no doubt, are named forms of thought,—our notions, judgments, and reasonings. But they are also, in relation to intuition or perception, forms of the realities,—the objects therein given. They are the ways in which we may, nay, must, mediate represent to ourselves what is given in the course of experience, through intuition. If the forms apply to all objects generally, and to every object indifferently, they ought not to be represented as having no application to any object.

§ 51. Further, as it is very distinctly the doctrine of Kant and of others on whom this exaggerated formal view is charged, that the contradictory is necessarily non-existent,—unreal as it is nonsensical,—it can hardly be fairly maintained that the logic they teach is abstracted from any relation to objective existence. Kant's vital mistake lay in regarding the laws of thought as of a wholly subjective character, and in restricting in the Logic as elsewhere what is necessary in thought to a purely subjective function,—a function of constitution,—whereas they represent but one side of a coincidence between human thought and divine thought as embodied in things.

The true conciliation of the Kantian and the realistic view is to be found in the principle that the understanding is apprehensive as the intuition,—apprehensive, to wit, of relations, as the latter is of the terms of the relations.

§ 52. We may go quite beyond saying that we have only to do with the consistency of our thoughts. We may quite well hold that this consistency is essential, negatively, to truth of fact,—and we may even vindicate the many connections of Identity and Non-Contradiction as correspondences to the actual connections of things. For these may be denied, and spoken of as “not absolute,”—that is, the actual oppositions of experience may be denied to be such, because it is assumed that behind this experience there is some one thing, or force, or entity which, being one, manifests itself in all. This, even if it could be proved, could not be shown to abolish the differences in time or as we actually perceive things.

§ 53. There is the view of Hegel, which, assuming the identity of thought and existence, identifies the laws of thought with the laws of being, or the forms of thought, as he interprets them, with the forms of being; then describes a certain process of so-called self-development of pure thought as also the process of the self-production of existence; identifies (or confuses) the form and the matter of thought, professing to evolve the latter out of the former as a pure evolution, apart from intuition or experience. This may be called the *metaphysico-logical* theory. But, in point of fact, there is nothing in its method in the least analogous to any recognised logical law; in fact, there is, from first to last, an absolute, even proclaimed, reversal of logical law, and thus of definite intelligibility, even rationality.¹

§ 54. This is not the place to enter into a full discussion of the Logic of Hegel, what may be called *Speculative Logic*. This would involve a discussion of the whole principles of his philosophy. But I may indicate generally the nature of his logical theory, and its relation to the Aristotelian. In Aristotle throughout truth is regarded as a relation,—a harmony between thought or judgment, our judgment and reality. The spirit of realism or dualism permeates the whole thinking of Aristotle, and no where is it more felt and seen than in the *Organon*. The logical conceptions, forms, terms,

¹ On this see *Descartes*, *Introd.*, §§ xi. xii.

laws, are taken directly from experience, and they are tested by reference to experience. Aristotle is the most concrete of logicians, in some respects the healthiest. His practical sense is as outstanding as his unmatched subtlety. His conception of truth as a relation or harmony between thought and reality, it is the principal end of Hegel to break down. With him there is no such distinction. There is no dualism, either of man and nature, of subject and object, of spirit and matter, of finite and infinite, of the real and the ideal, of man and God. So that logic in his conception need not seek to lay down criteria or rules for testing the true or real harmony of thought and things. There is no difference or distinction. And how does he proceed to show this? Of course, his process is that of Reason,—the pure reason,—pure thought. The idea in its total development. And what is this? In plain words, throw away man, nature, God,—go back to the stage of thought in itself—pure thought, objectless, indeterminate; or as it is identical with being, go back to qualityless being, without mark, feature, or discrimination of any sort, and you will get what will develop necessarily into all truth or reality, for these are but names for the same thing. This is thought in itself; the bare form of thought without object is your starting-point,—Reason in its first expression, Being in its primary reality. The development of this *prius* of all is the dialectic process,—the march of the speculative reason, the ongoing of the speculative logic. It makes, it is, in its course, man, nature, God,—all being; it is in its course, all truth. "*What is rational is real; what is real is rational.*" And this is the rational; this is the real. In the march—the wonderful march of the Idea—from in selfness, which is not yet even conscious, and is objectless,—from Being, which has not quality to distinguish it from nothingness,—the Aristotelic Logic is comprised. It is a stage, an early stage of the course, which is trampled out and yet absorbed. Aristotle represents the abstract point of view,—the point of view of the understanding, which still holds by difference and distinction and the laws of Identity and Non-contradiction. Speculative truth, however, lies in the fusion of contradictories and the march of universal identity. *Yes* is only *yes* as it is also *no*, and *no* is only *no* as it is also *yes*; and the truth lies in the *yes* which

is *no*, and the *no* which is *yes*. And we must not speak of contradiction as "absolute"; it is only temporary; in the real nature or truth of things opposites are one, and are only as they are one. What, in this case, we may ask, comes of moral distinctions? What, for example, of veracity and unverity? Are these simply temporal distinctions, to be fused in a higher medium, since contradiction is not absolute but perishable? And what of man the worshipper, and God the object of worship? When man worships does he worship only himself in another form? And is this God? Are there two orders of truth? One in which there is difference and distinction, another in which all this is abolished? Then, which is the true? and who is to decide this question? It will be meanwhile more reasonable for us intellectually, and better for us morally, to keep by the knowledge we have than trust in the "Speculative Logic."

§ 55. The Idea is developed, or rather develops itself, from stage to stage in virtue of its inherent power,—its being all potentially,—though it is at the same time a perfectly qualityless conception,—in three great lines,—Being, Essence, Notion, which of course come in the end to be the same. The treatment of these makes up the Philosophy or Logic of Hegel. And under the first two heads Hegel borrows the Aristotelic and Kantian categories, and seeks to show how they arise, move, and are transmuted. Under the third,—Notion,—we have the Aristotelic forms,—Notion, Judgment, and Reasoning, taken up and dealt with according to Hegel's conceptions. These forms are not in his view to be taken as modes of our knowing merely or as representing reality. They are "the living spirit itself of the reality, and nothing in the reality is true except what is by those forms and in those forms" (*En.*, p. 161, 162). The notion is an abstraction, but in its true concrete totality it is all that is. Judgment is the identity of the general and the particular. Attribute is only the general. The subject is the particular. The copula is their identity,—and so on. The outcome of the whole matter is that there is but one reality, and that is the Idea or Reason ever developing itself, absorbing its developments, and so becoming enriched, and rising, we cannot say finally, for there is no limit anywhere, but somehow and somewhere, to the consciousness of itself, as God who manifests all and

is all. This system here concerns us principally under the third head of Notion, and the theory of contradiction, to which reference will be made below. Meanwhile it is enough to say that a system which alleges the law of non-contradiction in reference to a definite concept or judgment not to be absolute, *i.e.*, that the statement is simply other than it is, even not what it is, must imply that this very statement is impossible; for it cannot be made except in terms of a definite proposition, and therefore, as at once alleging and denying the very same point, cannot be made at all.

§ 56. Another view which professes to follow Aristotle in substance is that of Ueberweg, who makes Logic "the science of the regulative laws of human knowledge." He explains his position thus. It is opposed to that of Kant "in the thoroughgoing proof of the way by which scientific insight is obtained, which is not brought about by *a priori* forms of purely subjective origin, finding application only to phænomenal objects present in the consciousness of the subject, but is reached by the combination of the facts of experience according to the logical rules which are conditioned by the objective order of things and whose observance secures an objective validity for our knowledge."¹ Ueberweg in this view follows in the line at least of Schleiermacher (*Dialektik* 1839), Ritter, Vorländer, George, Trendelenburg, Lotze, Beneke.

Ueberweg's view may be summarily stated thus: That Logic is the science of the forms of knowledge in general, of perception as well as of thought proper—mediate or representative knowledge; that the logical forms, or the forms of knowledge—Intuition, Notion, Judgment, Inference, System—correspond to, and are derived from the forms of real existence, the metaphysical laws; and that through the harmony of the forms of knowledge with those of reality, we obtain truth, material truth, or the correspondence of knowledge with what actually exists, at least as a presentation. This view approaches that of Aristotle. Aristotle "finds the standard of truth in the agreement of thought with what actually exists, which is the limit of science. The notion rightly formed, corresponds, according to Aristotle, to the essence of the thing (*οὐσία*, or *τὸ τί ἦν εἶναι*); the

¹ *Logic*, Preface.

judgment is an assertion about an existence or a non-existence; affirmation and negation correspond to union and separation in things; the different forms which the notions take in the judgment (or the kinds of denotation of existences, σχήματα τῆς κατηγορίας τῶν ὄντων) determine themselves according to the forms of existence; the middle term in a syllogism, correctly constructed, corresponds to the cause in the connected series of real events; the principles of scientific knowledge correspond to what is actually first in the nature of things." (Cf. *Met.*, iv. 7; ix. 10; x. 6.; *Categ.*, 12, 14 B, 21.) Ueberweg develops his view more completely in § 36 *et seq.*

Those who, like Ueberweg, hold that there is a correspondence between the logical laws and forms and the order of things, do not dispute the psychological fact of the necessary character in consciousness of these laws and forms. When it is said that there is this correspondence between the law in the consciousness of the subject, and the fact in the constitution of the object, a reference is made to the origin of the law as conditioned by the objective reality, and also as expressing and representing that reality. These are no doubt very important points; but they are rather of metaphysical import and significance than of logical. It is possible at least fully and scientifically to consider the nature and number of the logical laws as in consciousness, the forms of thought which flow from them, and their mutual relations, without considering especially the origin of the laws, or their representative character in relation to reality. Logic would thus be a complete though an abstract science; but not more abstract, or less capable of concrete application than arithmetic, which deals with numbers, their laws and relations, apart altogether in the first instance from any conception of their application, and apart also from the question as to the origin of number, in, for example, the successive units of time. We may thus deal abstractly with the laws of Logic and their evolutions, without at all, as Kant is supposed to have done, committing ourselves to the view of their purely subjective character, or a purely subjectivo-formal logic.

§ 57. Besides, the question of the origin of the laws and their precise metaphysical import may give rise to much doubtful disputation, and must necessarily involve both psychological and metaphysical theories, which, if kept up, as they need to

be, through a whole treatise of logic, may hamper greatly the systematic development of the science. To confine Logic as a science to what is common and universal in all human thinking, whatever be the particular psychological, metaphysical, or moral opinion we hold, is to give it a good, useful, and legitimate sphere. And so to treat it, does not imply or demand a greater abstraction than is common in kindred sciences. Besides, nothing could be of greater importance than that varying thinkers should agree as to a general science or canonic of thought for all actual and possible matter of thought.

§ 58. It seems to me that the whole of Ueberweg's reasoning on this point is really guided by extra-logical considerations. He holds a certain metaphysical doctrine of the truth or agreement of intuition, inner and outer, with reality. He holds distinctly that our internal intuition, or apprehension of the states of consciousness and of Self, is identical with the reality, that there is nothing in itself, self in itself or phenomenon in itself, above and beyond the actual self and phenomenon of conscious intuition, to which the latter have to conform, in order to be real or true. He discards all this superfine transcendentalism or verbalism. And very properly so. He further maintains the reality of space and time, as objects perceived, and not merely imposed on the matter of perception, as actual precepts as well as the matter, or elements in the matter, and as objective, conditioning our particular perceptions. He further maintains, on the ground of analogy, the reality of minds similar to our own in this world of experience, and on the same ground of analogy he holds that individual intuitions in general arise out of the original *blur* of perception, when man first begins to recognise himself as an individual essence in opposition to the outward world. •

§ 59. The logical correctness of the application of this form of knowledge is to be tested by the same criteria as the truth of all those elements of knowledge which originate in our internal, and go to complete our sense perception.¹ The whole of this doctrine really is based on an unverifiable trust in our faculties of intuition, a certain psychological analysis of their declarations, and a certain metaphysical

¹ *Logic*, § 46.

theory founded partly on this analysis and partly on analogical inference from it. But there is nothing here specially logical, except the principle of analogy, the laws of which it is the function of logic to investigate. There is also, of course, the special application of the principles of reasoning in general to certain psychological data. But to suppose that this particular realistic theory of inner and outer Intuition is the essential basis of Logic, is to peril the whole character of the science as a body of assured universal principles. We have a much wider, and, I think, a truer conception of Logic as a science when we leave those problems to psychology and metaphysics, and restrict, really widen, Logic by regarding it as the science of those principles which regulate our conceptions of any sort, negatively by the law of non-contradiction, and positively by the laws of necessary inference, and which, while not assuming any special psychological or metaphysical theory to be the true one, can yet, to a certain extent, regulate all. Even Material or Inductive Logic, on which the doctrine has the closest bearing, is independent of metaphysical theories regarding the nature of reality, and the correspondence therewith of human thought. All that it does or needs to do is to seek causes and laws or uniformities. The principles which regulate these, the tests of them, are very much independent of our views as to the exact contents of the notions and their relation to reality.

It is clear at least that on such a view of the sphere of Logic, "the regulative laws" of which it is called upon to treat must be of the most varied sorts. It must deal with matter of fact in intuition, and its general laws of cognition, with the necessary conditions, space and time; it must deal not only with the nature of conception, but with its relations to actual existence, not only with the nature of judgment as a process or product of cognition, but with the question of its relation to things. These are the questions of Psychology and Metaphysics. The theories, for example, of Descartes, Locke, Berkeley, Hume, Condillao, Kant, regarding the object of perception, and the process of perception, would all, on such a hypothesis, fall to be reviewed and the true theory given. The question of the origin of knowledge, the validity of our primal beliefs, the nature of causality and substance as forms of existence to which our knowledge ought to conform,

—these would be treated, as well as the laws of Inductive and Deductive Inference. This is true even though we distinguish the several contents of thinking from the contents of thought in general. This method can only lead to delay in the decision of the logical questions, to the confusion of what may be truly dealt with on any theory of the universe, real or ideal, with what is now, and may ultimately remain doubtful and unsolved. Surely we may treat of what is common in Concept, Judgment, and Inference, as we find these in actual and necessary exercise, without waiting for or even seeking for a settlement of all the possible questions, which may be raised regarding their origin, nature, and relations to their materials or contents, considered as objects of actual reality.

§ 60. The value of Ueberweg's doctrine lies in drawing attention to the genesis or grounds of logical forms and processes—viz., Conception, Judgment, Reasoning. Why, it may be asked, does thought take the forms of conception, judgment, and reasoning? This is no doubt a question preliminary to a study of the essential features and necessary laws of those processes. To answer this question of ground and origin, we need to go back to psychology and even to metaphysics; for we first spontaneously conceive, judge, and reason about the matter of intuition or experience. In other words, we exercise definite acts of consciousness, in the face of objects and upon objects. We affirm existence, we distinguish the permanent from the passing; we divide or conjoin existences, and we connect these causally or uniformly with the other. Still these acts have what may be called a logical side; they have a community of character subject to certain essential and necessary laws; and these we may study without specially considering whether the object apprehended, conceived, and judged is real or ideal, and what are the differences in the metaphysical characters of the objects which form the matter of our knowledge. This is truly all the formality which Logic need claim.

§ 61. But it may be asked, What precisely is the meaning of the reference or relation in these cases? How are they related, the logical and metaphysical judgments—for example? *Animal has organisation.* This is Substance and Inference. This corresponds closely to the Comprehensive

Judgment. It is the logical relation of subject and attribute. Again, *fire burns*. This is the relation of causality. But the advantage of the logical expression is that it is more general than either, and embraces both, and can be legislated for as such. In fact, the logical relation means that there are laws, possible laws, for predication whatever be the ground of predication, or whatever be its specific relation to the forms of reality.

§ 62. Further, this relation of Substance and Inherence, or Substance and Attribute, is not the only possible form of enunciation. We refer the subject to a class. We have judgments in extension. This represents quite a different relation in reason, or logically. The real relation here symbolised is that of Kind and Species, or Species and Individual in nature. Any given judgment is to be tested as true or false by reference to the actual matter which it embodies, the subject and class as these really are. But logic, as the universal science of thinking, finds points in common which can be legislated for in all class references, just as it does in all references of inherence. And these are dependent on the essential in the act of judging, and, therefore, indifferent to the matter judged. And what is more, logic finds, in its higher universality, points in common between the judgment of inherence and the judgment of classification, and these, too, dependent on the nature of the judging act, and is thus able to reach scientific precision, necessity, and universality, and to lay down the laws or conditions so far of a valid act of judging. Logic has in its proper or scientific character only remotely to do with even the abstract metaphysical forms,—the Predicaments of Aristotle, or the Categories of Kant.

§ 63. With regard to the Conditional Judgment—*if A is, B is*—this may refer to the relation of Cause and Effect. But in that case it would not be a strictly necessary inference,—not properly logical. For we can only know the terms of any causal relation by experience. It is, then, for us wholly contingent. The relation itself of causality,—*if an event be, it has a cause*,—is strictly necessary, but it can never warrant us in determining a similar necessity regarding any special instance of cause and effect,—regarding, in a word, actual effects and causes.

§ 64. When formal truth is represented as simply the absence of contradiction—*i.e.*, the agreement of thought with thought—as consequent with antecedent, a question may be raised as to whether we have in this agreement any ground for holding it to represent material or real truth. We think the consequent as dependent on the antecedent—*e.g.*, the motion of the tide on the position of the moon; or the *responsibility* of man on his possessing *free-intelligence*, or the predicate of *every one*, as likewise the predicate of *this* or *that* one of the class. The general answer to this is, that where the antecedent is already found to be real—*i.e.*, real as a matter of fact,—the consequent as necessarily involved in it is real also as a matter of fact. This holds in inference from whole to part. If the whole, of which something is predicated is, the part as involved in the existence of the whole is justly credited as really possessing a similar predicate. Valid or correct thought guarantees the connection between the antecedent and the consequent; and if the antecedent is, the consequent justly drawn from it is also.

CHAPTER VI.

LOGIC IS THE SCIENCE OF THOUGHT. SPEECH, THOUGHT, THINGS.
THE CATEGORIES OF ARISTOTLE AND KANT.

§ 65. Logic is the science of thought, not of speech. Logic is from λόγος, and this means thought and word equally,—*ratio et oratio*. The thought indicated may be taken as meaning intelligence or reason generally, or this or that intellectual act, be it concept, judgment, or reasoning, as contrasted with its expression in words. Etymologically, Logic may mean the science of the mental or inward thought, or of the outward expression; it may thus be the science of thought, or of language,—Grammar. Omitting meanwhile special consideration of the relations of thought and language, Logic is not the science of language. It only indirectly affords the main principles of Universal Grammar.

(α) Plato defined thought as the internal word, the communion or dialogue of the soul with itself,—ἐντὸς τῆς ψυχῆς πρὸς ἑαυτὴν διάλογος ἀνευ φωνῆς γιγνόμενος.

Λόγος, or discourse, with Aristotle is made up of the noun and verb, and has its meaning through convention; but each part has significance, at least has simple expression.—(*De Int.* c. 4.) Λόγος and other similar expressions in Aristotle appear with a clear grounded reference to the mental acts,—the παθήματα,—ultimately, in fact, to the essence (τὸ τί ἦν εἶναι).—(*Cf. Met.*, ii. 4, 1029, b. 19.) •

(β) The Stoics distinguished the λόγος ἐνδιδθετος, and the λόγος προφορικὸς. In later logicians this appears as the inward and outward word,—as *Discursus Mentalis* and *Discursus Vocalis*.—(Wallis, *Logica*, P. I. c. i.)

“Ita quamvis λόγος sua significatione tam sermonem quam rationem complectatur, tamen non a sermone sermocinalem, ut nonnulli autumant, sed a ratione rationalem et Logicam appellandam existimo.” (*Brevia et dilucida quaedam Prælia de Divisione, Definitione, et Argumentatione*,—Auctore Joanne Hamiltonio Scoto-Parisiensi. 1580.)

Logic was not applied by Aristotle as a name for the science which

he founded and nearly perfected. He had, indeed, no one name for it. *Analytic*, as applied to the principal parts of it, is the widest term to be found in Aristotle himself.

Cicero (*De Fin.*, i. 7, 22) uses the term *logica* for the science. It is in common use in this application with Alexander of Aphrodisias, and even with Galen. It was probably due to the earliest Aristotelic commentators, who employed it in opposition to the *Dialectic* of the Stoics. —(See Boethius ad Cic., *Top.*, p. 766. Cf. Prantl, *G. d. Logik*, i. 9, p. 535.)

A late commentator on Hermogenes divided Logic into Dialectic and Rhetoric.—(Cf. Prantl, *ibid.*)

(c) Aristotle speaks of those who contemplate logically (λογικῶς μὲν θεωροῦσιν, *An. Post.*, c. 21, 88 b. 35). On this Waitz, following Philoponus, remarks that τὸ ἀναλυτικῶς is opposed τῇ λογικῶς. The former is an accurate demonstration, which depends on the true principles of the thing itself, as opposed to that which is contained in a certain probable ratiocination. Biese translates λογικῶς “out of general grounds,” ἀναλυτικῶς “out of the essential determinations of proof.” The *logical* is thus almost the same as the *dialectical*, or that which does not belong to the truth itself, but to the art of discussion, by which we defend an opinion either as true or false. Hence is clear the sense in which the logical syllogism (λογικὸς συλλογισμὸς) is opposed to true demonstration (ἀπόδειξις), although in some passages the logical, in opposition to the rhetorical syllogism (enthymeme), may seem to signify true demonstration. The logical is also opposed to the physical point of view, as the abstract to the concrete. Logical doubt arises not from the contemplation of physical or singular things, but from ratiocination. Hence, after Aristotle, Cicero opposes logic to physical science, and calls *logic* that part of philosophy “quæ sit querendi ac disserendi.”—(*De Finibus*, i. 7. See Waitz, *An. Post.*, 82 b. 35.)

§ 66. Logic is essential to Grammar, while Grammar is not essential to Logic.

Grammar is the science of Speech, and Speech proper is reached in the combination of words called the sentence. That with which grammar begins is properly the sentence. The sentence is speech completed or perfected; it is the *oratio perfecta* of the older logicians as opposed to the mere term or *oratio imperfecta*. The analysis of the sentence by grammar yields us the parts of speech. The phrase, *parts of speech*, has no meaning except in relation to a whole of which there are parts. The whole is the sentence, that is, completed speech.

Logic is not the science of speech or of the parts of speech. It is not in any proper sense the science of expression. It is the science, within certain limits, of that of which speech is the expression. It is in fact the science of

thought,—of that indicated by the Term, the Proposition, the Reasoning. As the sentence is the unit of speech, that with which grammar begins, the Concept or Notion is the unit of Logic, that with which Logic begins, but with which it does not terminate.

§ 67. It is true that the principles of Logic are ordinarily proceeded upon in all thinking, in all reasoning, and they are embodied in every civilised language. But they are not explicit in the consciousness of the individual, and they lie scattered in language. Language testifies to their reality and their use, but no mere study of language could give us a scientific Logic. This can be reached only by a study of that consciousness which underlies all language, that thought of which language is symbolical. Language at the utmost can but corroborate the analysis of thought, as it must in its essentials conform to the constitution and laws of thought.

§ 68. Grammar is of use to Logic inasmuch as it offers to it the forms of words in which thought is expressed, and thus affords material for analysing and distinguishing the mental laws embodied in speech,—the reflection of thought. But Logic considers words only secondarily; its primary object is the concept expressed in language. Grammar considers expression; and only as universal, not specific or of a particular language, reaches universal laws. Logic, as dealing with thought in its nature and laws, reaches a body of principles common to all human thinking, whatever be the language in which it is expressed.

§ 69. Logic throws light on grammar, in respect of (*a*) the construction and nature of the sentence in all its forms; (*b*) the nature of predication; (*c*) the relation of the adjective to the noun, as a process at once of limitation and increased attribution, and in respect of other essential points. There can, indeed, be no true or thoroughgoing science of grammar, which is not founded on sound logical principles.

§ 70. It is obvious that the parts of speech, if significant at all, must represent forms of the logical consciousness. And we may approach the classification of the parts of speech either from the empirical manifestation of them in language, that is, by observation and classification; or we may approach from reflection on the inner or logical side of the mental forms which they represent.

The grammatical distinctions of the parts of speech cannot be thoroughly or profoundly studied from the purely empirical side, that is, from the fact of their manifestation in language. They exist simply as symbolical of inner or mental forms; and it is in these and in their mutual relations that we are to find the true principles of the science of grammar.

Aristotle has very properly distinguished these points in the relations of symbols to things,—viz., writing, which represents words; words, which represent conceptions; conceptions, which represent things.¹

With Aristotle *ἑρμηνεία* means every expression of thought, especially expression by the word. This expression may be simple or combined, as the term or the judgment. In the *Categories*, Aristotle considers words singly or apart from their combination (*ἀνεν συμπλοκῆς*).—(*Cat.*, 2 p. 1, col. a. l. 16.) In the *De Interpretatione*, he treats of them in their combinations.

He appears very distinctly to look at the parts of speech from the logical or reflective point of view. He tells us that the word is the representation of an affection of the mind, just as writing is an image of the modifications of the voice. He further grounds the mental form or modification, as is his consistent doctrine alike in the *Categories* and *Metaphysics*, on things or objects, and on the various forms of existence. The forms of thought and the things of which thoughts are the similitudes (*ὁμοιώματα*) are the same for all men. Language, like writing, varies.—(Cf. *De Interpretatione*, c. 1.)

(a) The precise relation of Logic, alike to thought and things, is raised by the doctrine of the *Categories* of Aristotle. It is, therefore, necessary to try to put this doctrine properly, as the question is still of interest to us, as well as of importance in respect of the Aristotelic theory itself. The place even which the theory of the *Categories* has historically occupied in Logic necessitates its consideration.

The synthesis (*συμπλοκή*) of terms is, as we have seen (p. 29), essential to truth. But what of the facts or elements of the synthesis? Dissolve the synthesis, and you have certain elements called by Aristotle *Categories* (*κατηγορίαι*). These are incomplex elements, out of which affirmation and negation are constituted.—(So Occam, *Logic*, i. 41.) They are ten in number,—viz., *οὐσία*, *ποσόν*, *ποιόν*, *πρός τι*, *πού*, *πότε*, *κεῖσθαι*, *ἔχειν*, *ποιεῖν*, *πάσχειν*. Boethius translated these: Substantia, Quantitas, Qualitas, Relatio, Ubi, Quando, Situm Esse, Habere, Actio, Passio. With Aristotle *κατηγορία* means what can be enunciated or re-

¹ Cf. *De Int.*, c. i.—Pacius *in loco*.

ferred, or what can enter into relation, whether as subject or predicate. Hence it was translated *prædicamentum* by Boethius. Hence also the word does not originally mean the ultimate classes of things or of primary notions.—(Cf. Trendelenburg, *Elem. Log. Arist.*, § 3.) As applied to the ten words, its use is restricted. At the same time, as John of Damascus puts it, these are the ten most general predicaments under which is found every word simply said, that is, every categorical word, which is neither affirmation nor negation.—(Cf. Prantl, iii. p. 373.)

In the earliest time of the commentators, there were three views as to what the Categories were intended to denote. Their objects were variously regarded as *words, thoughts, things*. Alexander and Eustathius held the first opinion; Porphyry the second; Herminius the third. Later, Boethius held them to be genera of things, with a view “to comprehend the infinite diversity of things which cannot fall under science in a few genera, and thus render that which, from its incomprehensible multitude could not be known, subject to the mind by the fewness of the genera.”—(*Ad Porphyr. a se transl.*, p. 75. Cf. Prantl, i.-xii. 84, p. 683.) Occam, again, held that the aim of Aristotle in the Categories is to discuss the first names of things, or words signifying things, in so far as they are significant. Aristotle, he holds, is ignorantly supposed to be speaking of things, when he is only speaking of words and their corresponding concepts. There is no proposed division of things beyond the mind; for the categories are not predicable of these, but only either of words, or concepts, or conventional signs. There is no substance existing beyond the mind, except individual substance.—(Cf. Prantl, iii.-xix. p. 866.)

It is clear that whatever be the ultimate application of the categories, they are originally borrowed from grammatical distinctions. As Trendelenburg has pointed out, the first four genera are made up of a substantive and adjectives and a comparative phrase; the last four are verbs, representing intransitive, active, and passive senses. The fifth and sixth are adverbs of place and time. But while thus of grammatical origin, Aristotle has so dealt with them as to apply them alike to notions and things. They represent, in a general way, alike what can be conceived, and what exists. They have, in fact, a grammatical, a conceptual, and an objective reference. Aristotle was here, indeed, faithful to the lines of his logical, even philosophical method, which was to pierce through the external form of words to thought and reality. Hence, in antiquity, Iamblichus was right when he said that the categories regard at once words, thoughts, and things. If, he argued, the words treated of have a meaning, then the categories cannot regard words only. If the categories treat of things, then things are designated not by the finger but by general ideas, and there is no expression of general ideas without the help of words. The categories then treat of ideas or thoughts, but not of pure thoughts, but of thoughts that repose on things, for philosophy is a study of things which are, not of things which are not. He concludes, therefore, that the end of the categories is the study of words, representing things by the medium of ideas. David the Armenian puts this conclusion still

more explicitly by saying that the end of the categories is the study of the first form of simple words [i.e., not yet formed into a proposition], expressing simple things by the medium of simple thoughts, not special or individual, particular or successive, but the most general.—(Cf. *Prolegomena* by David the Armenian to his indited Commentary given by St Hilaire, *Logique d'Aristot.*, ii., App., p. 523.)

It is clear, I think, that Aristotle regarded the logical processes or forms, conception, judgment, syllogism, as based on corresponding forms of real existence, on, in fact, the *σχήματα* of the categories. He teaches expressly that *οὐσία* or substance, being proper, is above demonstration, and yet is the foundation of it; and that as demonstration keeps to it or is parallel with it, we have science proper, necessary knowledge. This is substance regarded *per se*. Again, the other half of knowledge,—phenomenal knowledge, follows and corresponds to the other categories, which may all be regarded as forms of Being *per accidens*, forms in which Being clothes itself. This is virtually to say that the logical form in its utmost abstraction corresponds with the metaphysical form as discovered in the object of knowledge, and regarded likewise in its highest generality. He even says that it is for one and the same science to seek the general principles of Being, and the general principles of demonstration, and of the syllogism which constitutes it, expressly, however, guarding against the supposition that there can be demonstration of Being, while the latter is yet the only foundation of demonstration.—(*Met.*, v. c. 1, 1025, b. 14.) Being in itself belongs properly to substance. Being *per se* or substance, is, moreover, the only true and real Being. Being as attributed to the other categories, is to be taken only consequentially (*οὐχ' ἀπλῶς ἀλλ' ἐπομένως*).—(Cf. *Met.* vi. 4, 1030, a. 22.)

Occam's view regarding the classification of the categories is that of things taken simply, or without connotation, there are only three supreme genera—viz., *Substance, Quality, Relation*. No quantity, he holds, is in Aristotle's view, really distinct from substance and quality.—(*Logica*, i. 44. Cf. Prantl, iii. 372.) If genus be taken for everything predicable for itself and in abstraction from another, then there are ten genera *generalissima*.

It may be said that, properly speaking, *οὐσία* is a subject, not a predicate. But the truth on this point is, that *οὐσία* is only secondarily a subject; it is a subject in reference to all the nine categories which presuppose it, and which simply express it in its modifications. Substance is primarily a predicate in respect of *τὸ ὄν* or Being; it is a *κατηγορία τοῦ ὄντος*. It is the first determination of the *τὸ ὄν*,—the first definitely cognisable conception of it. The genus Being is determinately conceived as substance; and this latter gives in contrast the second substances, species and genus. Hence both *Ens* and *Unum* were regarded by the schoolmen as transcendent, or above the categories. They are of the First Intention, and common to all; and the ten predicaments are inferior to *Ens*. As Occam says, we may doubt whether C is A, or C is B, but not whether C is something; *ens* is, therefore, a common concept.—(See especially Occam, *Log.*, i. 38, and Prantl, iii. 370.)

Herein lies the point of connection between the metaphysic and the logic of Aristotle. The categories are forms of predication; but they are forms of predication founded on the forms of being. The first essential form of being is unity, the unity of the individual. This is the subject alike of being and of thought; or assertion. And all the genera or kinds of assertion are determined by and correspond to the forms of being. These are attributions applicable to being, as their subject either of inherence or of attribution.—(*Categories*, ii. 145.)

Substance (*οὐσία*), the individual, is with Aristotle the first substance,—first and supreme. It can neither be said of a subject, nor be in a subject.

Second substance embraces species in which first substances are (*ὑπάρχουσιν*), and the genera of these species (*ταῦτά τε καὶ τὰ τῶν εἰδῶν τούτων γένη*).

The first substances are the ground and principle of all the others, for they serve as subject to all, either of attribution or inherence. Without them nothing would be (*μὴ οὐσιῶν οὖν τῶν πρώτων οὐσιῶν ἀδύνατον τῶν ἄλλων τι εἶναι*).

The species is more substance than the genus, for it is nearer the first substance or individual. The species is to the genus that which the first substance is to the species; the species serves as foundation to the genus (*ὑποκείται γὰρ τὸ εἶδος τῷ γένει*).—(*Cat.*, v. p. 2, a. 11.)

It is thus we find in the first determination of existence the type of the logical subject, and in subsequent categories or forms of being the type of the essence (genus) and species, or the judgment and the principle of the syllogism itself, as the general applied to the particular.

We ought to note the ambiguity in the term *substance*. Boethius translated *οὐσία* by *substantia*, in the sense that it stood by itself, or subsisted apart,—as *man*, *horse*. Aristotle, too, defined it as that which could not be referred to anything as subject, but as that to which other things could be referred. This is its sense with Descartes and Spinoza. As the species is so far exemplified in the substance, the term came to mean the nature or law of the thing. This is more properly *essence*, *essentia*, than substance. In this confusing sense substance is constantly used in some modern systems.—(Cf. Trendelenburg, *El. Log. Arist.*, § 3.)

Substance or *οὐσία*, as Aristotle understands it, is cognisable only in the individual; indeed, exists only in the individual. The individual is the beginning of knowledge, and the only true point of departure for Ontology. Substance cannot be really separated from the individual. It is not materially distinct from it. Apart from sensible objects, substance is a mere abstraction. It is not a generality separated from all things, and existing *per se*. It resides essentially in the lower species, in individuals. Some, such as Plato, have wrongly attempted to put general ideas above substances, in fact, to make them substances. But this is a mere aberration of the logical reason; it is *λογικῶς* (*ἡγεῖν*). Let facts be appealed to, and there is no animal apart from individual animals. The general rests only on the particular; it is never substance. Farther, the particular is known by perception,

and the general by the reason in which it resides. The separation of the general from the particular, since Heraclitus, has been the bane of philosophy.

With Aristotle, the particular or individual (*τὰ καθ' ἑκάστην*) is the foundation alike of his theory of being and knowing,—*Metaphysic* and *Logic*.—(See especially *Cat.* v.) With Plato the beginning is the general and universal. The two are thus apparently diametrically opposed.

Further, being rightly interpreted means unity; *τὸ ἓν καὶ τὸ ὅν*—are one and the same thing. There is no being without unity; there is no unity without being. The individual is the true point of departure, and it is the basis of genera and species. Being is truly only in the individual. The individual is what it is, because it is one.—(See end of *Categories*.)

What, therefore, is predicable of being is predicable of unity. Unity is, in fact, in all the categories; it is that of which they are predicated.

(b) Kant has criticised the categories of Aristotle as empirical and without order.—(*Kritik, Trans. An.*, i. 1. § iii.) As for the first charge, his own classification would have been greatly improved in number and character by more careful analysis of experience. As to the second, there can be little doubt that there is a certain reference to order in the Aristotelic scheme; and no doubt whatever that putting substance first is much more reasonable than the Kantian or any other arrangement.

Kant is quite wrong in supposing that Aristotle called the categories *prædicaments*, or by any term precisely corresponding to this. He is wrong in supposing that Aristotle added five categories to the original ten, under the name of post-*prædicaments*.—(Cf. St Hilaire, *Logique d'Aristote*, Pref., p. 83.) All this only shows how little he had read either of Aristotle or of the history of philosophy after his time.

Kant's categories are the forms or frames under which things, or the matter of knowledge, must come, in order to be an object of knowledge at all, that is, intelligible. They are properly subjective and constitutive of the objects of thought. Kant is quite wrong in supposing that the aim of Aristotle in the scheme of the categories was the same as his own in the table of the categories of the Understanding. Aristotle's reference is distinctly to things as they are, and as their reality is represented in words, the most general words. With Aristotle there is no idea of the constitution of objects; he seeks to enumerate the classes of things as existing.

The categories of Kant are professed to be "deduced," not to be got from experience or in experience, to be of transcendental origin. They are four in number—Quantity, Quality, Relation, and Modality. Each of these is subdivided into three; hence twelve species of judgments, and hence twelve forms of judgment. They are simply borrowed from the categories of Aristotle, which are misconceived by him, and misapplied. They have no proper co-ordination or subordination; some are involved in others. Relation is in all of them. They betray the unfaithfulness of his method, however described, to the facts of judgment and experience. His *limitative* judgment is a mere fiction,

resulting from a misconception of wherein negation in a proposition truly lies.—(Cf. St Hilaire, *La Logique d'Aristote*, Preface.)

The difficulties of the application of Kant's Categories to the matter or possible objects are, moreover, insuperable. These cannot be applied to this or that matter, with conscious discrimination, unless on the supposition of the object being already constituted, and apprehended as such, in accordance with the category, which is wholly opposed to the idea of the constitution of the object by category. Indeed, the difficulty commences at an earlier stage; for intuition cannot put a timeless matter into time, or a spaceless matter into space, far less tell when time alone is to be applied, or both time and space. As has been well said, the *Kritik* is really the romance of the Pure Reason.

On Hegel's misconceptions and misrepresentations of the Categories of Aristotle, see especially Waitz, *Organon*, i. p. 272 *et seq.*

CHAPTER VII.

LOGIC—THE SCIENCE OF THOUGHT—WHAT THOUGHT IS—
INTUITION AND THOUGHT.

§ 71. As a term *Thought* is ambiguous. (1.) It is used as a general name for every mental phenomenon as in consciousness. In this use, it emphasises the fact of consciousness as attaching to the mental phenomena in general. It thus embraces acts of Intellect, Will, states of Feeling and Desire. Thought in this application is matter of the science of Psychology.

(2.) Thought is used to denote all the acts of the Intelligence or Cognitive side of consciousness, whether Perception, Memory, Imagination, or Understanding. As thus used, it excludes Feeling, Desire, Volition.

(3.) Thought in its strictest sense denotes the Faculty of the Understanding. Here it may be used to mark (a) the Faculty itself; (b) the Process; (c) the Product of this Faculty. These latter are the Concept or Notion, Judgment, and Inference, including Reasoning. This faculty has various names, such as Comparison, Discursive Faculty, *Διάνοια*, Verstand. Logic contemplates Thought in the sense indicated by this Faculty. It may be called Thought Proper.

§ 72. Intuition is the basis of all thought and of all knowledge of objects, whether of outer or inner experience, in so far as objects are viewed as real. As to possible or ideal objects or classes of objects, these too depend on intuition. The limit of construction of the possible object, on its material side, is the intuition, separately it may be, of the qualities combined.

§ 73. Every intuition is distinct from every other. This is

founded on the condition of our experience of it—viz., time or succession. The intuition of one moment differs from the intuition of the next moment, by the element of succession, before and after. A continuous intuition is really a series of intuitions repeated with more or less vivacity. Even supposing the object of the intuition to be the same or similar, the intuitions differ by relation to time, and in respect to external objects in relation also to space.

§ 74. Intuition gives us a unity, the undivided unity of an object in a given time, or time and space. Thought also gives us a unity; but this is a unity of identity or resemblance between things, or units numerically different. The whole of intuition is a Singular; the whole of thought is a Universal. Even the combination of parts in intuition, for example, surface or extension, is but an undivided whole or singular; for it is the percept of a definite time, or definite time or place, and no other.

§ 75. Thought in its rudimentary form is Conception, and this is the knowledge of the common or general in individuals, of the one in the many. It is the knowledge or notion of the point or points in which a plurality of impressions or objects to self-consciousness agree. This feature of community, or generality of knowledge, is itself the common character of all the acts and products of Thought or Understanding—viz., Conception, Judgment, Reasoning. To know what Judgment and Reasoning mean, we must first understand what Conception means. Let us illustrate meanwhile the first or rudimentary act of thinking—viz., Conception.

§ 76. In this explanation will come out at least the logical distinction between Perception or Intuition and Thought.

Let us take any object which is before us, any object of the senses, say what we call *a tree* or *a house*. What object exactly means it is not now necessary to consider. To suppose that it means only impression on consciousness is enough. We naturally speak of this as what we see; we suppose that we obtain all our knowledge of it from the faculty of vision. The tree I see has a particular size, form, colour, and shape of leaf. It exists now before me as I see or perceive it. It is through the sense of vision, or perhaps the sense of vision combined with the other senses, that I

apprehend those points about the tree. But supposing that I get this knowledge from the sense or senses, is this all which I know about the object before me? Is this all even which I say about it, when I call it *a tree*? If you reflect a little, you will see that this question must be answered in the negative, ere I think and say *this is a tree*. I have already mentally compared it with other objects which I also call *trees*; I have found that it resembles those other objects; and I have already set it along with those other objects in my mind; in a word, I have assigned it to a *class* of things,—I have classified it. But what does classifying imply? It implies that while assigning it to a definite class, I have excluded it from other classes to which an object might have been assigned. I say it is a tree,—*not* a house, *not* a table, *not* a chair. I have said further it is *a tree*—*i.e.*, it is one among many other trees. Now in order to do all this, I must have more knowledge than I get in the single act of vision, by which I see what I call the tree; for this tells me nothing but that the object exists before me, now and here. I must have the knowledge implied in a class-notion,—I must have a knowledge of the points of resemblance, or the common features of all trees,—I must have a knowledge of the relation which these objects bear to each other; in a word, I must have a notion, or concept, or general idea; and in applying this general knowledge to the particular case before me, I apply or exercise *thought*, logical thought, in its most rudimentary form. This apprehension of points of resemblance, or of relations between objects, is not an act of sense, nor is it an object of sense; it is an act of the Intellect or Understanding, by which I break away from or rise superior to the limitations of my sense knowledge. And this effort, this rising to a knowledge of relations, renders judgment and reasoning possible for us.

Its first result in language is the *term* or *general term*, or *common noun* of our grammars. It is distinguished, of course, from the *singular term* or *proper noun*. *City* is a general term, because it is capable of being applied indefinitely to the objects of the class. *Glasgow* or *this city* are singular terms, because they denote only one object of the class. Observe that *term* does not necessarily mean a single word. *Glasgow* is a single word and a singular term;

but *this city* is as much a singular term, because it is a phrase which denotes but one object of thought. Whatever word or set of words indicates the general in our thought is a Common Term; whatever word or set of words indicates the particular, or individual, or one in our thought, is a Singular Term.

§ 77. There are thus two sides in knowledge or consciousness. There is the function of the Sense or Perception which notes the features of an object now and here; and there is the function of Thought or Comprehension which grasps them together by means of the Notion or General Idea, and classifies and names the object perceived. The one is the intuitive or particular side of our knowledge; the other is the general, even the universal. But for the latter power our sense knowledge would be chaos; we should simply be bewildered amid recurrent and conflicting impressions from things.

What thought does in regard to ordinary objects, science does in regard to other and more remote objects. It grasps things by means of conceptions or notions, and laws; holds the variety in the unity of thought. It is in this sense, the true and proper sense, that knowledge is power. It is the power of the kingdom of man over the world.

§ 78. To explain this more fully, we may say that thought, as considered by Logic, does not properly begin until we have compared this thing with that other thing, and found a point of similarity,—some common mark or attribute. We now have in the community of the attribute a class of things, either an actual class or an ideal class, or both. We can now observe and note a third or fourth thing as possessing an attribute or mark like that we already know. There is thus a recognition,—the recognition of similarity in the mark. Having noted and named the mark *lustrous*, as in several metals we have seen, we recognise it in other objects which come up in the course of observation; and thus know them as *lustrous*. So with any common mark, or sum of marks once we hold them. I have in my mind, as the result of comparison, certain marks which I include in the name *mountain, river, sea, tree*. In forming these, in grouping them, I have exercised thought. There have been apprehension and recognition. And for the future, on every occasion on which I recognise the marks as

in an object of experience, and thus call it a *mountain, river, sea, tree*, I also exercise thought. There is thus in every object of our knowledge a twofold side. There is the apprehension of the object, as at this time, or at this time and place. This is the individual and singular side of the object, due to perception or intuition. There is further the cognition and recognition of the thing as having a mark or marks like what I already know. This is the universal side of the object. I speak of *this mountain, this tree*. The *this* indicates the individual or singular in my knowledge. The *mountain* or *tree* indicates the common and universal in my knowledge. These are really inseparable elements; but the one is *intuition*, the other is *thought proper*. This distinction would still be preserved, if I were only to imagine an object like a mountain or tree. There would still be the individual side,—the image in my mind; and the common or universal side,—the recognition of the likeness in the mark or marks. There would be an image and a relation of likeness conceived as manifested in this individual case, and as indefinitely applicable to a plurality of similar cases. It is now clear that we can speak of thought as the recognition of a thing as through, in, or under another. When I recognise in an object the attributes of *life, sensation, and motion*, I know the object for what it is, an *animal*, and I know it to be an animal, and not a stone, through these marks. In this I have also recognised the object as under a notion, for I have classed it as an animal, or put it under the class *animal*, as one of the things included under or embraced by the notion and name. Thought then as conception, is a process of mentally marking things, and of classing things by means of the marks.

§ 79. Conception is thus virtually a judgment. There are two things in the mind, or rather in the indivisible conception of the object. There is the thing and its mark or class. When I expressly unfold this conception, consciously set the mark on the object, or consciously set the object under its class, I judge, I affirm, I conjoin object and mark, or I include the object under the class notion. I say *plant has organisation, Metals are lustrous*. When I proceed further and conjoin two judgments, so that by necessary implication a third follows from them, I reason—As :—

All metals are lustrous ;

Iridium is a metal ;

It is lustrous ; or, iridium is lustrous ; for it is a metal, and metals are lustrous.

All these acts are the same essentially, whether Conception, Judgment, or Reasoning. They are all simply forms of the power of Comparison. Logic is the science of thought, in so far as this power is concerned.

(a) "On the material given or presented by Perception, that is Sense, or Reflection,—Internal Perception,—the Understanding works. It compares; it recognises similarity or difference; it conjoins and disjoins material qualities. This is its first* or primary function. By comparing attributes, and finding a point of similarity, the one in the many, it makes a concept. By joining or disjoining concepts, it makes a judgment; by comparing and joining or disjoining judgments, it makes a reasoning. The essential point in all these acts is the recognising one thing through or under another. Thought proper is thus an act of comprehension, or a recognition of one thing as in or under another. Thought proper is the cognition of one object of thought by another, in or under which it is mentally included,—in other words, thought is the knowledge of a thing through a concept or general notion, or of one notion through another. In thought all that we think about is considered either as something containing or as something contained,—in other words, every process of thought is only a cognition of the necessary relations of two concepts."—(Hamilton, *Logic*, L. iii.)

"All thought is a comparison, a recognition of similarity or difference, a conjunction or disjunction; in other words, a synthesis or analysis of its objects. In conception, that is, in the formation of concepts (or general notions), it compares, disjoins or conjoins attributes; in an act of judgment it compares, disjoins or conjoins concepts; in reasoning it compares, disjoins or conjoins judgments. In each step of this process there is one essential element; to think, to compare, to conjoin or disjoin, it is necessary to recognise one thing through or under another; and therefore, in defining thought proper, we may either define it as an act of comparison or as a recognition of one notion as in or under another."—(*Logic*, L. i. pp. 13, 14.) *

(b) Hamilton insists strongly on the essential identity of Concept, Judgment, and Reasoning, or rather, on the element of judgment as common to all. "Both concepts and reasonings may be reduced to judgments. . . . A concept is a judgment; for, on the one hand, it is nothing but the result of a foregone judgment, or series of judgments, fixed and recorded in a word, a sign; and it is only amplified by the annexation of a new attribute through a continuance of the same process. On the other hand, as a concept is thus the synthesis or complexion and the record, I may add, of one or more prior acts of judgment, it can, it is evident, be analysed into these again; every concept

is in fact a judgment, or a fasciculus of judgments. These judgments are not explicitly developed in thought, and not formally expressed in terms."—(*Logic*, L. vii. p. 117.)

§ 80. This is Thought, logical thought. But we must not assume that there is no thought in the intuition or perception which logical thought supposes, and which is its datum. We cannot speak of this or that thing even, without thought, that is, without implying and applying a general or universal notion. *Thing* itself is general; so is *existence* or *being*; so are *one* and *many*, *identity* and *difference*. And these are implied in the most elementary intuition. These refer, however, to the nature and constitution of being, of things as they are, or, at least, as they are known to us. And Logic does not profess to investigate the nature and genesis of these notions or universals. This is the province of Metaphysics or of the science of Being, its nature and conditions. Further, these metaphysical notions are ultimately inconceivable, in the sense of being inexplicable by anything beyond themselves, and what transcends the explicable or conceivable transcends Logic. Logic is thus a secondary science; it is the science of the conceivable and its relations. This it is necessary to state, considering the very loose and ambiguous manner in which Thought is used in current philosophical literature.

§ 81. These extreme metaphysical notions, such as *being*, *substance*, *cause*, do not afford the means of distinguishing the individual things of experience. *Being* is common to all, and thus affords no distinction; *cause* and *substance* are extreme generalities. They do not help us to distinguish among individual causes or among individual substances. Things classed merely as one or many are not known in their essential properties, or in their distinctive marks. What we desire to do by thought, after it has passed from the early, vague, and indefinite consciousness of the world and its contents, is to mark and group objects, to put them in classes, and under special laws, to know things clearly and distinctly, by means of resembling and differing features. Logic legislates for all processes of this sort. It helps us to classify, define, arrange, and systematise our knowledge.

§ 82. The only possible conciliation of intuition and thought, in other words, of experience and abstraction, is

that, in individual instances, category, or what is afterwards called category, is perceived or apprehended as fact or object. Thus it is given as real, as real as anything we can know. This holds of time and space, or *a priori* intuition, and of all the possible categories. This, then, as a presentation, as an intuition of what is definitely real, is represented by us in the form of a thought, conception, or abstract divorced from a given time or space. But the representation gives the presentation, the real; and the forms of the thought, the representation, give, in their most general aspect, the actual facts. The forms might, indeed, be generalised, and thus regarded as gatherings from experience. They are so, but they are more; there is a coincidence between the intuition and the conception generally as to elements; and this means constitutional or *a priori* forms of intelligence, as well as intuitional and *a posteriori* generalisation.

(a) This was the doctrine of Occam:—

"Intellectus noster pro statu isto non tantum cognoscit sensibilia, sed etiam in particulari et intuitive cognoscit aliqua intelligibilia quæ nullo modo cadunt sub sensu. . . . Cujusmodi sunt intellectiones, actus voluntatis, delectatio, tristitia et ejusmodi, quæ potest homo experiri inesse sibi, quæ tamen non sunt sensibilia nobis."—(*Sent. Proh.*, qu. i. H. H. Prantl, iii. 751). This may be fairly regarded as comprehending the relations, unpicturable, among sensible objects. He tells us elsewhere, "The intellect not only cognises universals, but even intuitively cognises those things which the sense cognises."—(*Sent. Proh.*, qu. i. L. L.) First, I cognise some singulars in particular, intuitively or abstractively; and this arises either from the object or from the habit left over from the first act. After intuition, there follows a second act, distinct from the first, terminated by some such objective being (i.e., representative), as it first gave in the subjective being (i.e., in the subject existing); and that second act produces universals and second intentions.—(Occam, *Sent.* ii. qu. 25. Prantl, 784.)

The universal is the first object in the primacy of adequation, not in the primacy of generation. The object of sense and intellect is absolutely the same; but the singular is the first object of sense in the order of generation. Singular means here one in number, and not a sign of anything. Every cognition is both universal and singular; but the question regards cognition properly simple and singular. (1.) The singular, thus understood, is the first known, because it is a thing outside the mind, and all outside the mind is singular. (2.) This cognition, as simple, singular, first is intuitive. (3.) The first abstractive cognition in the primacy of generation is not a cognition properly singular, but common. Thus, that which from a distance causes sensation, in virtue of which I can only judge that that seen is being, affords

the knowledge of being, and nothing lower (more specific), and, therefore, not properly a singular concept. Intuitive cognition is properly singular, not on account of a greater assimilation to one than to another, but because it is naturally caused by one and not by another.—(*Quod.*, I. 911-13. Prantl, ii. 346.)

§ 88. The order and progress of thought in general is a psychological question. But the steps may be summarily indicated. First, the lowest point from which consciousness as thought can be conceived to begin, is the cognition of an object as something, something not nothing. There is apprehension and discrimination. This discrimination is twofold: (1.) Through the relation of the object as a form of being to non-existence or non-appearance, or to other objects, it may be, contiguous to it; (2.) Through the relation of the object to the knowing subject, as an object discriminated from the knower. Secondly, This something or object is necessarily apprehended as *now*, or as *now* and *here*—that is, in time, or in time and space. It becomes *this* thing, the thing of the present moment, as opposed to *that*, either past or to come. Thirdly, It comes to be known as such or such a thing; that is, it is regarded as qualified, and so discriminated from other things otherwise qualified. Fourthly, It comes to be known as one of many things; it is quantified. Fifthly, It comes to be known either as a permanent or as the form of a permanent. This is substance, and substance and phænomenon. Sixthly, It is known in relation to what preceded it, as in appearance a new form of being, conditioned and determined by the preceding. This is the form, the relation of causality,—causality within limited existence. These are the main metaphysical relations of objects known as existing.

(a) As Occam puts it, the intellect proceeds from potency to act; hence no one understands any singular thing whatever, without immediately understanding or being able to understand the most common being (*ens communissimum*).—(*Sent.* i., *Dist.* 3, qu. 5, B.B. Prantl, iii. 745.)

When it is said that our cognition begins with the more confused and more universal, such confusion and universality do not exclude singularity and designation (*signationem*) of actual existence in the thing without, nor is it so confused and universal as to exclude *here* and *now*, but rather to include them. . . . The universal which we seek is of quite another character, because from its nature (*ratione*) it excludes *here* and *now*, and designation and actuality of existence.

—(Duns Scotus, *In de rer. princ.*, 13, 3 (vol. iii.), p. 118 A. Prantl, iii. 212, § 119.)

(b) Scotus points out three functions of the intellect in the cognition of actual existence—(1.) contemplating the reality in the sensation (perception); (2.) reflectively knowing that we know; (3.) comparison of the reality perceived with the universal for intellection. Thus whiteness is not only actually, but it is also colour.—(*In de rer. princ.*, 13, 3 (vol. iii.), p. 112 A. Prantl, iii. 212, § 119.)

§ 84. Pure thought in the Hegelian sense, or the self-sufficiency of intellectual power wholly freed from intuition, or intermixture of organic function, is impossible. It is impossible to partition the unity or indeterminateness of existence into a plurality of distinct notions by means of mere intellectual function.¹ This in fact is equivalent to supposing that pure or mere Extension in thought can of itself develop into Comprehension, that the attenuated abstract can clothe itself in attributes, and so become concrete;—that what is not in the cause may yet appear in the effect. This violates every principle of reason and intelligibility.

Equally baseless is the Kantian view of the outward, or matter, as a chaos into which the mind is supposed to put order and system out of its own subjectivity, or from the spontaneity of the subject. Things are already conformed to reason and order, and this arrangement is, or is apprehended, in organic function.²

Unless there be a correlative order in things, and various forms of that order, the subject is utterly incapable of ordering, or determining which kind of *a priori* form or category ought to apply in any given circumstances. No application of category is possible, unless on the condition of the apprehension as already existing of the kind or character of the thing to be categorised.

§ 85. The growth of speech, like that of thought, shows a progress from the indeterminate to the determinate, corresponding to that of the logical consciousness. "Originally, in every language, the sound, while significant of meaning or attribute, indicated indifferently noun and verb, without declension or conjugation. Parts of speech were thus not originally discriminated by different words. Thus in the Indo-Germanic language, the oldest form for the words which now

¹ Cf. Schleiermacher, *Dialektik*, p. 108.

² Cf. Ueberweg, *Logik*, p. 106.

sound *deed, done, do, doper, doing*, was *dha* (*to set, do*). This was the common root of all the subsequent forms of the word. The one form *dha* stood for noun, verb, adjective indifferently.

"In the second stage of the language, in order to express distinctions, they repeated the roots twice, not yet supposed to be words, along with another root, and linked them together into one word; for example, the first person of the present was *dha-dha-mi*.

"In the third stage, the elements were fused into one whole, as *dhadhâmi*. In that earliest form *dha* there lay, as yet unseparated and undeveloped, the different grammatical references, their whole verbal and nominal modifications."¹

How this separation and discrimination, the assignation of different sound forms to different logical conceptions, arose, and was perfected in a suitable and matured language, is the problem of Comparative Philology.²

¹ Schleicher, quoted by Ueberweg, *Logic*, pp 116, 117.

² On the genesis of naming in reference to Concepts, see below, p 104 *et seq.*

CHAPTER VIII.

LOGIC THE SCIENCE OF THOUGHT, AS THOUGHT, OR OF THE FORMS OF THOUGHT—WHAT ARE THE FORMS OF THOUGHT.

§ 86. While Logic is thus conversant not with Speech but with Thought, it is not conversant with everything that is implied even in Thought Proper. Every thought, whether a Concept, a Judgment, or a Reasoning, may be viewed in two aspects,—as to its matter, and as to its form.

The distinction between form and matter in general is one not difficult to comprehend and illustrate. The form of an object is, speaking generally, the mode or manner in which its constituent materials have been arranged. The form of a house depends on the collocation of the materials, as the form of a statue depends on their moulding and arrangement. The material of an object is, in a sense, the unessential part of the object, seeing that the object itself might remain the same—the same in form, and thus continue to be the object it was before, a house of a particular kind, or a statue of an individual man, even though the material were changed, say from sandstone to brick, or from brass to marble. The form is, so to speak, the essential part, that which makes the object to be what it is, to belong to a definite class, and to constitute a definite individual.

In analogy, to a certain extent, with this are the matter and the form of thought. In every thought, be it a concept, a judgment, or a reasoning, there is form as well as matter. The form, moreover, is the essential part, that which gives the thought its character, and which does not change with a change of the objects or matter about which we think. *E.g.*, the matter of a judgment lies in the notions or terms,

the form in the inclusion or exclusion of these terms. *Plant is organised.* Here the notions *plant* and *organised* constitute the matter; the form is indicated by the copula *is*, which marks inclusion. The form here makes, so to speak, the thought, and the thought a judgment; and all that can be laid down regarding the laws of inclusion in a judgment could be laid down regarding this and every other instance of an inclusive judgment, although the terms or matter were wholly different from the present one, and from each other.

§ 87. It may be said further regarding matter and form in logical thought, that the matter is given to or provided for thought by other powers than thought itself, very much as the material of the statue is provided to the artist; so that the form is not only what is essential to thought, but is peculiar to thought. The form is the function or work of thought. It is the product or result of the operation of thought on the faculties of experience. This is expressed otherwise by saying that thought is an elaborative power, working on data presented to it. But this provision by perception and memory of materials to thought, does not imply the existence in the consciousness of the materials prior to some act of thought; all that is needed is that they be simultaneous; and it should be clearly apprehended that thought does not create the materials. Nay, further, as will be shown in the sequel, thought properly speaking, does not create the form or general relations of the materials.

These relations of Conception, Judgment, and Reasoning are definite, necessary, universal; they can be legislated for; they are subject to universal law; the matter is not.

§ 88. Perhaps the nearest approach to this conception of Logic as the science of the form of thought was the view taken of it by the older logicians as the science of second intentions applied to first. In a concept two degrees of formality are distinguished. These degrees were named by the older logicians the first and second intention. A notion of the first intention is a notion viewed in relation to the objects which it represents,—in its immediate class relationship. Thus the concepts *tree* and *bird* are of the first intention, when they are regarded as representing the objects of their respective classes, or as terms for a number of possible

objects. But notions may be viewed not only in relation to the actual or possible objects which they represent; they may be considered in their own mutual relations. Thus the notions *tree* and *oak* may be viewed not merely in relation to the individuals of the class, but may be compared with each other. Thus it will be found that *tree* is a wider notion than *oak*,—is, in fact, the genus of which *oak* is the species, that is, one of the classes which it embraces. We have thus a new form of relationship between notions themselves. We may contemplate this, and name it, making it an object of scientific investigation. This relationship of notions to each other was designated by the older logicians as the second intention of notions. All the Predicables were thus regarded as notions of the second intention, and Logic was defined as the science of second intention applied to first, since the former classified and regulated the latter.¹

§ 89. Logic cannot embrace the matter of thought,—of the concept, judgment, and reasoning. Indeed, no one science can. For the matter is indefinitely, even, it may be, infinitely various. There is matter of Sensation, Perception Outer and Inner, Imagination. Even under each of these heads it is various. There is the indefinite variety of the sciences,—mechanical, chemical, vital. The successive variety of the objects is apprehended here, but we have no principle or principles from which we can infer what is diverse or what is common in them. This cannot be demonstrated, far less in any sense deduced. The variety runs back to no one principle we know or can know. No one form of it could in the nature of things lead us to predict, even to conceive its subsequent form. No one science could, therefore, tell us all the variety of things, far less systematise it. The utmost we can do is, first, to analyse and state the common principles or categories which regulate its appearance, or phenomenal being for us; and, secondly, by observation and experiment to test and show what kinds of matter do pass into other kinds, and by what empirical laws this transmutation is regulated. This is the province of Metaphysics and Physics. The indefinite variety of science seeks to meet, and yet it falls short of, the infinite variety of things.

§ 90. But if Logic cannot embrace all objects or all the

¹ See above, p. 33.

variety of experience, and legislate for it, it can legislate for none of it. If it cannot take in all matter or objects, it can take in none. It is not at liberty to make an arbitrary selection; it would cease to be a science, if it did. By vindicating for itself the community of form in things, it vindicates its definite and peculiar sphere. Logic can only deal with things in all their possible variety, as they stand in relation to human knowledge, as they exist for us at all, by looking not to the matter of experience as it is objectively, but to this as it stands in relation to our faculty of Intelligence or Thought, as it is in fact intelligible or conceivable by us.

§ 91: In what sense and how far is Thought, Pure Thought, abstract? Or what is the relation of form and matter?

In the first place, there is no existence in our mind of actual form apart from matter of thought, or of actual matter of thought apart from form. "No object is cogitable except under some form of thought; and no form of thought has any existence in consciousness except some object be thought under it." The question as to potential form and potential matter, or how matter and form absolutely arise, is not now before us. It is enough for us at present to say that matter and form in thought or to thought are inseparable correlatives, though by no means identical in fact; not identical, just because they are conceived as correlative.

In the second place, it is contended that form can be separated ideally from matter in the same way and to the same extent as is done in the method of other abstract knowledge,—for example, in Geometry; and so dealt with as an object of scientific examination and law. I cannot realise a form of thought *per se*; I cannot realise a matter of thought *per se*; but I can realise, consciously think the same or similar form of thought apart from this or that matter. I can conceive the same representative form of the concept in a thousand successive different notions; and the same inclusive form of the judgments in a thousand successive different judgments. And I can discover what is common to the form in all these different matters, and in all possible different matters. I can thus reach their laws, the necessary and universal laws, and state them scientifically. The Geometer, by showing one figure, say triangle, can demonstrate the

universal properties of the class triangle. He does not need this or that triangle to show the properties; he is independent of any one; but he is not independent of every one. He needs some one figure. So it is with the logician. No matter which he happens to know or to use restricts him; but he needs some matter, of concept, judgment, reasoning, and by means of that he realises and shows his universal laws. If the logician can obtain and exhibit universal properties belonging to every kind of thinking form, as the mathematician can exhibit universal properties belonging to every conceivable figure, the reality and the abstract universality of Logic are vindicated. The proof of this is to be found in the details and order of the science of Logic to be exhibited.

§ 92. Thought has three forms—viz., Concept or Notion, Judgment, Inference, including especially Reasoning.

The first form of Thought is the Concept or Notion. The thought indicated by the concept *man*, and expressed by the term, contains matter and form. The matter is an attribute or series of attributes. The form consists in this attribute or sum of attributes having a representative function. Through means of this function the concept is capable of equally representing in knowledge any one of a plurality of individuals.

Viewed as to matter or content, concepts differ indefinitely. *Stone, plant, animal, man*, all differ as to content or the attributes which constitute them. They all agree in possessing a representative form,—that is, they are capable of standing for and helping us to know the individuals which they respectively embrace. In a word, they are all concepts, but concepts of differing attributes, and therefore differing classes and individuals. In technical language, they vary in matter; they agree in form. Logically the form is the essential element, the matter the unessential; for while the matter may vary without destroying the concept as concept, the form cannot vary or be changed without abolishing the thought as a concept, changing it as a mere concept.

In Judgment there are form and matter. Every judgment agrees in having the same form. This is inclusion or exclusion, attribution or non-attribution. It either includes the subject under the predicate, as, *The plant is organised—i.e., belongs to, forms part of, the class organised*; or it excludes the subject from the predicate, as, *The rock is not organised*.

This is a judgment in Extension, the predicate notion being a class-term. In Comprehension, the judgment attributes the predicate to the subject, or declares that it is not attributable to the subject, as, *This man fights bravely. Water does not violate the law of gravity.* In this case, the predicate term means an attribute, not a class. The form of the judgment is the same, whatever the terms may be, or whatever we judge about. And rules can be given regarding the form, in every kind of matter.

In Reasoning there is matter, and there is form. The matter consists of two propositions or premises, and a third proposition or conclusion. The form lies in the necessary connection between the two premises and the conclusion. Thus,—

Plant is organised ;
Snowdrop is plant ;
 \therefore *Snowdrop is organised.*

Or in letters,—*A is B ;*
C is A ;
 \therefore *C is B.*

As in the Concept and Judgment, so thus in the Reasoning. Our thought as a concept preserves the same form, whatever be the attributes constitutive of the notion ; our thought as a judgment preserves the same form, whatever be the concepts or terms, whose relation is stated, or about which we judge ; our thought as a reasoning preserves the same form, whatever be the things about which we reason. The form is necessary and universal ; the matter temporary and contingent to thought. Herein lies the central idea of Logic as a science. It is the science of the permanent and universal in the relations of human thought.

§ 93. I have hitherto spoken of thought as concept in relation to the objects of experience or intuition, and shown its functions in regard to them. But it is now necessary to say that thought rises to a higher degree than merely the recognition of the objects of experience, the putting these under sections or classes. It must be kept in mind that Perception or Intuition is restricted in several ways. It apprehends a quality or an object as *now* and *here* present to the mind,—in other words, it is limited by definite conditions

of time and place. And thinking (or conceiving), if it were exercised only on the matter of perception, could but recognise resemblances amid that matter, and group together qualities actually presented to it. Thought would thus follow the footsteps of Perception, and be but the hand-maid of a limited experience. Now this is not so. Thought is free. We speak of the freedom of the will. We speak of that noble power of free choice, which is the great moving force of all moral life, as the free power pre-eminently—and so it is. But thought is a free power also. It is free in a way which enables it to rise above the limitations of actual perception. Thought is not restricted by the giving or presenting to it of the quality or individual object of perception. Once we have obtained the concept or general idea, thought can, with the concurrence of imagination, construct the individual quality or object which embodies the attributes of the notion, and thus pass into act without the aid of Perception.

§ 94. To illustrate this. We may, as I have said, recognise an object which we meet with in experience as like to an object we have met with before. We thus apply to the new object our notional or conceptual knowledge. But it is obvious that, in order to think of an object which embodies the attributes of our notion, we do not require to wait for the perception of the second individual object. We have in our mind the main features of the class. And in virtue of this possession, potential it may be, we can at any time, and in any space, construct a picture or image in the mind of an individual object, be it *mountain, river, ship, or house*, like what we formerly saw, embodying the attributes of our notion. We are no longer restricted by definite conditions of time and space, no longer limited to what we merely saw or felt. Thought now deals with an image—*i.e.*, an individual object which imagination inspired by it has created or constructed. It embodies attributes, common to a class, in this one image. Intelligence has at length awoken to a full consciousness of its own strength and freedom; and imagination is its ready servant,—ready to embody in the definite picture or the glowing image the otherwise dim and unrealised attributes. Thought has now an unlimited quantitative power; it has

a faculty of constructing individual objects or images which embody a definite set of qualities. Quantitatively, it is unlimited; qualitatively, it is limited by the constituent attributes of its notion.

§ 95. Perhaps the simplest illustration of this is as follows: suppose we have somehow in our mind the notion of *triangle* or *square*. It is clear that we can embody these notions, or represent them as individual pictures, in very various ways. These pictures may differ very much from each other as to time, place, and material.* But they will agree in possessing or exhibiting the common features of *triangle* and *square*. The triangle imagined may be *equilateral* (all sides equal), *isosceles* (two sides equal), or *scalene* (no sides equal). It may be of wood, or stone, or iron, or silver. It may be black or white, red or green. In all these particulars it may vary. In all these we are free, free to construct our individual object as we choose, provided only we preserve the common features of a figure formed by the mutual intersection of three straight lines. Hence all intuition is definite and limited; all thought is in a sense unrestricted and free. This exercise of thought, apart from intuition is Pure or Formal thought, the only pure thought we know; whereas when thought is exercised along with and upon perception, we have Mixed or Material Thought.

(a) With Schleiermacher pure thinking means thinking with a view to science, as opposed to ordinary and artistic thinking. "Science is identical in all the thinking minds producing it, and agrees with the existence thought about. Pure thought, he maintains against Hegel, cannot have a peculiar beginning distinct from all other thinking, and arise originally as something special for itself. In every kind of thinking the activity of the reason can be exercised only on the basis of outer and inner perception. There is no act without the 'intellectual function,' and there is none without the 'organic function.'¹ Only a relative preponderance of the one or the other function exists in the different ways of thinking. Agreement with existence is immediately given in inner perception, and is attainable mediately also on the basis of outer perception.

"There is in the view of Schleiermacher a parallelism, but not an identity between the forms of thinking and knowing, and the forms of real existence. Thinking depends upon perception, perception upon the influence, affection, or impression from the objects or being without us."²

Ueberweg adds that Schleiermacher's views agree with the results of

¹ *Daubert*, § 107-114.

² Ueberweg, *System of Logic*, § 38.

unprejudiced scientific investigation, and correspond more truly than Hegel's to the idea of the universe as one whole organism, in which the unity of the whole does not interfere with the manifold and relative independence of single sides and members; sameness in common fundamental characters, does not remove or render meaningless difference in specific and individual properties, and no one member can be freed, with respect to his actions, or even his existence, from being conditioned by any other.¹

§ 96. "Pure thought, as meaning the consciousness of general notions and of nothing else, is an operation which never takes place in the human mind. Our only choice lies between notions as exemplified in individual objects, and notions as represented in signs, spoken or unspoken. And the notion as represented in language is but the substitute for the notion embodied in intuition, and derives all the conditions of its validity from the possibility of the latter. Language, though indispensable as an instrument of thought, lends itself equally to every combination, and thus furnishes no criterion by which we can distinguish between sense and nonsense, between the conceivable and the inconceivable. A *round*, *square*, or a *bilinear figure* is as a formed speech, quite as possible as a *straight line* or an *equilateral triangle*. The mere juxtaposition of the words does not indicate the possibility or the impossibility of the corresponding conception, until we attempt to construct by intuition an individual object in accordance with it."²

¹ Ueberweg, *System of Logic*, § 33, p. 71.

² Mansel, *Met.*, p. 187.

CHAPTER IX.

THE CONCEPT—HOW FORMED—THE GENERAL AND THE
ABSTRACT.

§ 97. We have seen what Thought in general is, what are its functions, and what are its forms. The next question is, How does Thought, especially as Conception, arise—what is its origin and genesis?

The ground of all thought is the consciousness that something is or exists. This implies perception of a quality at a particular time, or time and place, or a sensation, or emotion at a definite time. Lower than this we cannot go; and this implies an intuition of reality or being. We have no conception of abstract being to begin with; we do not even know what being means, until we realise it or particularise it in some sensation of quality perceived. The *is* with which knowledge begins is totally different from the logical copula—the *is* of comparison. The former implies a judgment of real existence, the latter implies nothing more than a judgment of congruence or harmony between terms.

§ 98. What is at first cognised is thus merely something, or form of being. But this is vague. The question is—How from this do we rise to precise logical or scientific thought? How are General Ideas, Notions, or Concepts formed in the mind? How do we get them? or make them? This is chiefly a psychological question, but we must note the main features of the process.

First of all, we have certain impressions on the senses. This is a vague phrase, but it may be regarded as meaning sensations and perceptions, or what we afterwards name as such. Each sense is fitted to receive and to give us a definite

impression. The Eye gives us colours, the Ear sounds, the Taste certain sensations. We may get these singly or in combination with other impressions. Take them singly first. We find that they are many, numerous, successive. They occur at different places and in different times; but they are not all unlike. The impressions vary in time, but they are like in character as impressions. Thus I may have experience of colours in succession, or at different times, which make the same or a similar impression on the percipient. Numerically they are different; subjectively, or as I perceive them, they are the same, or they are not distinguishable. The moment I apprehend likeness or similarity between two separate impressions, I have the ground of the Notion, General Idea, or Concept. I have thought in the proper sense of that word; for thought in its earliest form is the apprehension of relation—of likeness or resemblance. Now, observe this is the act of a power higher than Perception, for I now apprehend a relation; and a relation is that which I may think, but it is not that which I can see. It is thus that I get such notions as that of *colour* itself—*red, black, blue*—*loud and low, harsh and soft, sweet and bitter*, and so on.

§ 99. Secondly, impressions on the senses are not always given singly or separately; they are also given together or at the same time—*i.e.*, in groups. When I look at an orange, I have, or seem to have, various impressions—sensations and perceptions. It is *yellow*, it is *round*, it is *rough*, it has *weight*, and when I taste it it has a certain *flavour*. These various contemporaneous impressions make up my idea of the object, which I call *an orange*.

Other objects, or other bundles of impressions, are presented or given to me. Besides the orange, I may see what I call a *marble*, or a *cricket-ball*. These, too, mean to me a certain sum of impressions. But it is clear that I cannot go on for ever seeing objects or bundles of qualities in this way, without attempting to connect them in some mode or other. One object, even one impression, would, if wholly disconnected, destroy the preceding one and leave me simply the blank of knowledge. Naturally, therefore, or instinctively, I fix on some point of connection between those objects more than mere succession in time. I fix on a point or points of resemblance among them—a point of unity, in fact, by means of

which I may be able to join the otherwise various objects together. The mind is wearied and perplexed with the seemingly infinite variety of the objects of Perception or Intuition. When, therefore, I discover a point of resemblance among the otherwise varied objects, I concentrate my attention on that—I disregard the other qualities in which the objects may differ; and this one point or feature—this unity amid diversity—becomes for me a Notion or Concept, which enables me to class the objects as one. The orange, for example, differs from the marble in many points, the cricket-ball differs from both in many points; but in one point they agree—they are *round*; and by means of this concept I class them as one. I have here gone through three mental processes. The one is Abstraction. I have abstracted one special feature from the other qualities of the object perceived at the same time, and I have abstracted one quality from the other object; I have compared these. I apprehend them as the same or similar; I have now performed Generalisation and got the General Idea or Notion. The Notion or Concept is, therefore, “the knowledge of the point or points in which two or more objects agree.” This is to *conceive* or think in its simplest form; it is to unify—to think several objects as one. Intuition or Perception is the faculty of the diverse or varied; thought of the one—of the unity amid diversity. In Intuition we are comparatively passive, liable to be overwhelmed, as it were, by the infinity of the impressions made upon us. In thought we assert our true activity, react on the impressions we receive, reduce them to unity and science, and thus acquire a certain mastery over the universe of things. Thought is thus a conquering power.

§ 100. Thirdly, it may be asked why, in any given case, should we fix on one feature of a complex object or sum of features rather than another? Is there any reason for our abstraction of or attention to one feature amid many, rather than to another or others? We have already seen the reason for our seeking to fix on some feature or other in the object exclusively. This is because we instinctively, or in the interest of comprehension, seek to connect objects varied and varying in time. But the circumstance which leads us to the particular feature is different from this. This lies in the fact that a certain feature or certain features of an object are

more striking or impressive than others—*i.e.*, naturally fitted to evoke a higher degree of attention and interest. The mind is thus drawn to and fixed upon that feature or those features to the exclusion of the others. If, at the same time, this striking feature be a constant or permanent character of the object, wherever it is offered to our perception, we come to regard it as a characteristic mark or note. Finding the same or a similar characteristic feature constantly present in a succession or plurality of objects, we generalise, — we take it as the mark or content of our notion of a class of things. It becomes a concept under which we group a plurality of objects, or form a class-notion. Hence, for example, such class-notions as *flying*, *swimming*, as applied to creatures; *flumen* or *stream*, as applied to flowing water; *stagnum* or *standing pool*, as applied to lake.

§ 101. And here we come upon one distinction between ordinary and scientific classification. Ordinary thought looks rather to what is impressive or striking in an object; scientific seeks rather for what is primary in nature as opposed to what is derivative or secondary. The distinction between the primary and derivative attributes as grounds of classification, is well seen in what is known as the Natural System in Botany. Here attributes upon which other attributes depend, are fixed on as grounds of classification. Whereas in the system of Linnæus which precoded the natural one, it was rather the outward or striking feature, mainly the number of stamens, which formed the ground of classification. This gave a descriptive botany; the deeper reference to morphological and structural features led to the better understanding of the properties of the individual plant, and also of the natural affinities of plants in general.

The distinction between primary and derivative attributes is very well shown in geometry. The definitions of *point*, *line*, *superficies*, and others, are strictly ultimate and primary; they give the essence or elements of the concept *extension*, in so far as it is the object of pure geometry; and they are the grounds of the secondary attributes or properties of *figured extension*, as *triangle*, *circle*, *square*. The furthest conclusions of pure geometrical reasoning presuppose these, and by means of postulates and axioms flow necessarily from them.

§ 102. Further, it follows from the abstraction involved in

the concept, as the sum of common qualities only, that it will always represent certain qualities—viz., the common, to the exclusion of the special or individual. And thus the name which is given to the concept, and which fixes it as it were in the objective, will call up only certain features of an object, these probably the most striking, and will not mark, though it may suggest the others. “Names, as has been well said [at least common names or nouns], are in truth the signs not of things themselves, but of our partial and generalised conceptions of things.” Or as Mr Max Müller has put it, somewhat unguardedly I must observe, “all nouns express originally one out of the many attributes of a thing, and that attribute, whether a quality or action, is necessarily a general idea.”¹ As examples: moon is measurer (ma, Sanscrit); flumen is flowing water; sea is tossed about water (si); stagnum is standing water; serpent is the creeper (sarpa); anguis is *ἄχις* (anhi), the throttler; drum or druim is ridge, as in Drumalban; field is felled (feld), the cleared spot; hope is haven, shelter (Iceland); pen or ben is head.

(α) Abstraction is used in two senses, which should be distinguished.

(1.) When we look at one object which possesses a variety of qualities, say a tree, we are sometimes said to abstract one of these qualities from the other. This we do when we think, for example, of the *height* of the object, without precisely regarding anything else in connection with it. We are thus said to form an abstract idea of the *height* of the object; and we may make the idea still more abstract, by thinking and speaking of *height* and *tallness* in general. An abstract idea in this view, is an idea abstracted or withdrawn from other ideas which enter into a complex object of thought. This is the means of our gaining definite or precise knowledge,—knowledge prescinded, as it were, or cut off from other knowledge.

(2.) Abstraction is also employed to indicate the fact, that in looking at a complex object, we withdraw, turn away, or abstract our regard from certain qualities of the object, and attend only to one. In this case we are not said to abstract one quality from the others; but we attend to one quality and withdraw or abstract the mind from the others. In the former case, the single quality regarded out of any others may be said to be abstracted; in the latter case, the quality is viewed as an object of attention, and it is the mind or view of the mind which is abstracted or withdrawn from the remaining qualities. It is obvious that all this is merely a matter of terminology. Attention to one special quality of an object implies abstraction from the

¹ P. 362.

others; and abstraction from the others implies attention to the one, if the object remains a matter of thought at all.

§ 103. The feature, noted abstractly, may be merely an individual feature so to speak,—it may be merely a something known in time or space. We may, for example, have the impression of what we afterwards call *colour* from an object, although we do not know more of this impression than that it is merely something distinguished from other impressions which the object may make. We do not as yet know whether other things may possess this quality or not. We may apprehend also what we call *hardness* in an object, although we do not consider whether there be other objects in which we might also find this quality. And we may think of or apprehend *whiteness* in an object, without considering its other qualities, such as its *figure*, *size*, &c. This would be called an abstract idea, because we consider the quality, as it were, apart from the other qualities of the object. But we might make this mere abstract idea an abstract and general idea, if we were to find a similar impression, say *whiteness* or *hardness*, in other objects. In this case our notion would involve a relation of resemblance or similarity, and we should rise to the abstract yet general idea of *redness* or *hardness*; for these notions imply a quality common to a number of objects. I do not say that *redness* or *hardness*, or any abstract term, is not possible, simply as in contrast with other qualities of the object, and as not necessarily implying similarity or relation of resemblance between several objects. On the contrary, such terms, and abstract terms in general,—all nouns in *ness*,—rather imply originally a contrast between the intuition of the quality denoted and other qualities of the object. If we speak of *redness* in an object, we mean to distinguish this from its *roundness* or *squareness*, its *bigness* or its *littleness*; and in this way we have a perfectly definite knowledge. And this would be the knowledge of a particular quality as opposed to other qualities. We go through this process in all attentive and careful acts of knowledge. We desire to attend to one feature, as contrasted with others; and it does not matter to us whether this feature is shared in common with other objects or not. At first the sense of the savage is thus attracted and abstracted; but the very same process passes on in the mind of the very highest culture; for the faculty of con-

centrated abstraction is that which characterises and marks the men of strongest intelligence and genius. But, as a rule, abstract nouns, such as *redness*, *whiteness*, *hardness*, *softness*, are general in their application; and we mean by them a common quality,—a quality which is predicable of several objects. This, of course, implies generalisation. We have gone beyond the mere process of abstraction: we have found a similar feature in objects; and we have named that similar feature—abstractly, no doubt; we have, in a word, generalised. Yet we must keep in mind that the abstraction preceded the generalisation: that we may abstract without generalising, but cannot generalise without abstraction.

§ 104. It is thus of importance carefully to note that an abstract idea is not necessarily a general idea, or an idea regarded as applicable to more than one object. This has been recognised theoretically by philosophers; but it has been not unfrequently overlooked in practice, and in the construction of theories of the origin of thought and language. Stewart has put the true nature of an abstract idea in the following passage:—

“A person who had never seen but one rose, might yet have been able to consider its colour apart from its other qualities; and, therefore, there may be such a thing as an idea which is at once *abstract* and *particular*. After having perceived this quality as belonging to a variety of individuals, we can consider it without reference to any of them, and thus form the notion of *redness* or *whiteness* in general, which may be called a *general abstract idea*.”¹ This is obvious with regard to the qualities of any individual object presented to us. We are able to regard any one of its qualities to the exclusion of the others. I may, for example, make the *hardness* of this table an object of my attention, and, in so doing, may be said to abstract the quality of hardness from the other qualities of the table, such as its *size*, *figure*, &c. *Hardness* is in this case an abstract idea; it is viewed by me in itself and apart from the other qualities of the object in which it is found. But it is not yet general, it is not properly a concept. It is the individual quality of an individual object; and even if it were possible to view it apart from any object whatever, it would not cease to be simply an individual impression.

¹ *Elements*, I. c. iv. § 1.

(a) According to Hamilton, abstraction is not properly a positive act; it is merely the negation of attention. Concentrated attention on a single point leads to an abstraction of consciousness from others in an object. Abstraction should not be applied to that on which attention is concentrated. Here we *prescind*, rather than abstract. Of the qualities A, B, and C, we prescind A in abstracting from B and C.

Further, abstraction in this sense, as performed on individual objects, gives only an individual notion. "The notion of the figure of the desk before me is an abstract idea—an idea that makes part of the total notion of that body, and on which I have concentrated my attention, in order to consider it exclusively. This idea is abstract, but it is at the same time individual; it represents the figure of this particular desk, and not the figure of any other body."—(*Met.*, L. ii. 278.) There are thus individual abstract notions, and abstract general notions.

§ 105. This gives rise to the distinction between Abstract and Concrete Terms or names. *Humanity* is said to be abstract; and *man* is said to be concrete. *Redness* is abstract; *red* is concrete. The difference is said to be that the latter, the concrete noun, indicates an attribute or attributes in or with a being, something existing or conceived as existing; whereas the abstract noun is applied to the mere attribute or attributes. Now I think that this is more a distinction of language than of thought. It is true that *human*, *man*, *coloured*, imply directly something to which these attributes belong; but *humanity*, *colour*, imply equally, if not so directly, an object to which they belong, or subject in which they inhere. We cannot realise to thought the attributes implied in the abstract term *humanity*, without thinking of *man* in which they are embodied. So far as language goes, *humanity* indicates attributes a step further removed from the concrete than *man*, but that is all. If we actually give meaning either to the notions *humanity* or *man*, we must equally embody them in a definite concrete image or object. Mere abstract thought is an impossibility. The abstract exists only in the term; it is not actual thought; it is the mere possibility of our realising thought.

§ 106. No doubt we do make abstract terms the subjects of propositions. We speak of *virtue*, *duty*, *humanity*, as *right*, *obligatory*, *worthy*. But we have a tendency to make abstractions realities, and to think that these by themselves may people the universe; whereas it is our thought of them which gives them life—even meaning. In this point of view, the individual object alone is the real—the abstract is a mere

passing show or dim shadow of the individual as the real, imperfectly representing the fact of our experience. Neither the abstract nor the general, as in thought, is the real for us; by these we mean at the furthest to imply that there are beings, definite realities of space and time, and that these realities have certain mutual relations or attributes. The very fact of our giving attributes to things means that they are, and that they are diverse as well; for all similarity or likeness implies that the things known as similar are also diverse—diverse in their true existence as individuals of space and time. Otherwise similarity would be meaningless; there would be not similarity, but simple identity. But it is things or beings, otherwise different, which we hold together by the bond of resemblance.

§ 107. An abstract idea is thus primarily that of a quality or attribute, and it may be regarded as opposed to the concrete when it forms one of the qualities of a lower notion. Thus in the scale, *organisation* is abstract in respect of *animal*, for it is higher up and enters into the lower *animal* as a determining element or quality. The abstract is thus always a less determinate notion than the concrete, the lower or concrete being fuller as it were of attributes or qualities. In this way the abstract quality is at the root of the generic idea.

§ 108. The course of inquiry which has now been pursued, in regard to the nature and formation of notions, has a direct bearing on a question much debated by psychologists and philologists,—I refer to the origin of our class—knowledge; in other words, the *primum cognitum*. The question is, What do we first apprehend—the individual object or the general idea?

(1.) We have already found that our knowledge of objects is at first vague and indefinite; (2.) we classify them according to certain very general resemblances, as of time and place; (3.) we are attracted by certain striking features in the objects, which we exclusively attend to; and (4.) we generalise, or transform these abstracted features into general ideas; (5.) we then look upon numerically different objects as possessing or embodying this attribute or those attributes. We thus in the end individualise objects by distinguishing them as members of a class, or as possessing this or that definite attribute. It is really in virtue of the general idea or notion

that we regard objects as distinguished from each other, as belonging to this class of things and not to that. So that our general knowledge is the means of setting the objects of our experience in the precise light of individual objects, as special instances of general notions.

§ 109. In reply, accordingly, to the question now proposed—of the *primum cognitum*—I agree with those who hold, in opposition to a certain class of philosophers, that we do not at first know individual objects in their true character as individuals. Our knowledge of all objects is at first vague and indefinite; and the first step towards clear or definite knowledge is when we attend to the striking feature of an object,—when, in a word, we begin to abstract. The knowledge we gain by abstraction is further transformed into the general by an increasing experience of new objects with a feature similar to that in the object we originally observed. Having reached the point of a general idea, we now have a clear and distinct apprehension of objects as individuals,—as the members of different and definite classes. So that our knowledge may be viewed as progressing from the dimness of the indefinite, through the abstract, to the clearness of general and individual vision.

§ 110. This view, however, is not less opposed to the doctrine which makes our knowledge begin with the definitely general, and which has been attributed to Leibnitz, among other philosophers. It seems to me impossible, from the nature of the case, to maintain with truth that our knowledge begins with the general idea. This involves the conception of a plurality of individual objects, possessing a common feature. These objects are necessarily already in our experience, and intelligence, dealing with them, forms the general idea. It would, indeed, I believe, be more correct to say that in a sense our thought begins at once with the general and the individual, that the two dawn on consciousness together; that as we are elaborating the concept out of individuals, we are also making these themselves distinct objects of consciousness. In truth, as we do not think the individual apart from the general, or the general apart from the individual, this process of a double or twofold evolution of intelligence really takes place. Perfected or matured thought really commences with the general idea and the individual instance of it at one and the same time.

§ 111. The doctrine now advanced thus supersedes the whole of the old controversy regarding the *primum cognitum*. And I hold that this view applies very emphatically, not only to our general ideas but to our universal ideas as well. We have no universal ideas in any proper sense of the word before the particular. We have no idea of Being before we apprehend some being, or being in a definite form. Nor have we the universal ideas of unity, identity, quantity, quality, relation, and so on, before the particulars or perceptions in which they are embodied. Chronologically, these, the universal and the particular, are realised together, and each is necessary to the other, though they have different sources in the mind. And I hold it especially wrong to say that the universal develops into the particular, or that the particular is evolved out of it. This is a meaningless statement. It supposes the universal to be first in thought, whereas it has no meaning at all, unless it is along with the particular in thought. There is a logical concomitance between the two, but there is no logical or ideal priority; and this is needed for evolution. A theory of this sort which constantly charges abstraction on the opposite view, is itself abstraction run mad.

CHAPTER X.

THE CONCEPT—ITS CHARACTERISTICS SPECIALLY CONSIDERED.

§ 112. The general characteristics of the Concept or Notion, viewed as the product of Abstraction and Generalisation, may be stated as follows :—

- (1.) The Concept is Representative.
- (2.) It is Partial or Inadequate.
- (3.) It is a knowledge of Relation, which is not picturable.
- (4.) It has two sides or aspects—that of Comprehension and that of Extension.
- (5.) It is perfected by being expressed in a Term.

§ 113. As the sum of notes or marks in which a plurality of objects agree, it is a Notion ; as that by means of which several are grasped as one, or as the ideal unity of several objects, it is a Concept—holding in one through the common quality or qualities. Its first and essential function is, therefore, the power of representing any one of the individual objects, actual or possible, which may possess the quality or qualities it contains.

§ 114. To this it should be added, as Esser has observed, that a concept is properly the representation of an object not merely through marks which distinguish it from other objects in general, but through its distinctive marks, that is, those marks which distinguish it from the objects which come nearest to it. The distinctive marks of an object are those which make it to be *this*, not *that*—that is, they are peculiar and essential. *E.g.*, the concept of a *square* is not simply that of a *four-sided figure*, for this does not distinguish it from an *oblong* or a *rhombus* ; but of a four-sided figure which has *all its sides equal, and all its angles right angles*.

(a) The representative function of the Concept was indicated in the doctrine of *ὑπόθεσις*, or *Suppositio*, due apparently to the Byzantine logicians. *Suppositio* means *positio pro alio* or *aliis*—*Supponere pro alio*—putting in the place of. The word stands in the place of the thing, or of the modification of the mind (*passio animæ*), and this conventionally (*ex institutione, ad placitum*). The *passio animæ*, the *intentio*, whether *intuitio* or *conceptus*, stands naturally in place of the thing. But the singular impression, as a *passio animæ*, is an intention, as much as the concept proper, which represents in one what is common to many.—(Cf. Occam, *Summa Logica*, c. xii. *et passim*.) The Greeks subdivided *ὑπόθεσις*, or *Suppositio*, into common, and discrete (*κοινὴ, διωρισμένη*). The common is, through a common term, as *man*—the discrete, through an individual name, as *Socrates*, or of the demonstrative pronoun—*This is the man*.—(Cf. Michael Psellus, in Prantl, ii. 280.) For the scholastic distinctions of *Suppositio*, *Personalis*, *Simplex*, and *Materialis*, see Occam, *Sum. Log.*, i. 70.

§ 115. A notion or concept, as founded on abstraction, is necessarily a partial and inadequate representation of the individual, at least in so far as the individual of sense embodies a plurality of qualities. For the notion is but the sum of the common qualities, and this implies leaving out the individual ones.

Where the individual is a singular impression, as in the case of a definite colour—say *red* or *white*, or where there is a simple notion, as *resistance*—the concept entirely represents the individual, except as to definite time or space. There is nothing more in the notion of a definite colour than there is in the percept, except the apprehension of similarity to other colours. So it is in the case of the concepts of definite *sounds*, *tastes*, &c.

But a concept, in so far as it relates to a complexus of qualities apprehended at the same time and in the unity of an object, is partial and inadequate, for it only brings before us the object in so far as it possesses a quality or qualities common to others. In this respect the contrast of Memory and Thought is complete. The representation of memory is perfect in proportion as it gives us all the features of the object, that is, the scene or definite sum of experience apprehended in a given time. In memory, our effort is to bring back every feature of what made up a past whole of experience. Given but a part of it, we try to recall the other parts, one after another, until the whole scene flashes again upon us, as we knew it in its actual past reality. It is the

nature of memory to totalise, and thus to individualise. The nature of thought is the very opposite. Thought leaves out all the special individual features or circumstances in its single act; it gives us the result, the picture of generalisation. Notional or conceptual knowledge, viewed in relation to the complex individual, is thus necessarily inadequate, incomplete. It gives us a part only of the real individual, the individual of experience. "We sacrifice completeness of view to obtain universality."

(a) Hamilton states as a general characteristic of the concept, that it is a representation of a part only of the various attributes or characters of which an individual object is the sum; and consequently affords only "one-sided and inadequate knowledge of the things which are thought under it."—(*Logic*, L. vii.)

He illustrates this by reference to the individual—*Socrates*. We may think him by any one of the concepts—*Athenian, Greek, European, Man, Biped, Animal, Being*; but in doing so we throw out of view the far greater number of characters of which Socrates is the complement. —(*Ibid.*) Mr Mansel accepts this doctrine when he says that "a concept is not the adequate and actual representative of any single object, but an inadequate and potential representative of many."

If, however, we apply this general statement of the nature of the concept to that of a single attribute, or to an abstract attribute which may represent the whole nature of a thing, as *lineal extension, time, resistance*, it will require modification. The concept in this instance represents the attribute (or attributes) of the thing in its entirety; and yet it does not cease to be a concept—that is, to be applicable to an indefinite plurality of individuals, and realisable in each. If there be, as there is, the concept of abstract attributes, the concept can afford complete knowledge, though it does not usually do so,—especially in the case of concrete and individual objects of time and space. With this is closely connected the question, Can there be a Concept of the Individual? Hamilton has repeatedly restricted concept to the common quality or qualities of individual objects, and the relation which this implies, as more than can be represented in imagination. It indicates the thought suggested by a general term. Yet he speaks of "the concept or notion" of Socrates,—meaning the whole attributes "which distinguish him from all other men, and together make up my notion or concept of him."—(*Logic*, L. v.) He speaks also of the concept when at its greatest comprehension as "being a complement of the whole attributes of an individual object, which by these attributes it thinks and discriminates from every other."—(L. viii.) Again, however, he says, speaking of the limits of division: "If a concept be an individual, that is, only a bundle of individual qualities, it is indivisible, is, in fact, not a proper or abstract concept at all, but only a concrete representation of imagination."—(L. viii.)

The solution of this apparent discrepancy may be sought in the following note to the *Discussions*, p. 13. "The understanding, thought

proper, notion, concept, &c., may coincide or not with imagination, representation proper, image, &c. The two faculties do not coincide in a general notion; for we cannot represent man or horse in an actual image without individualising the universal: and thus contradiction emerges. But in the individual, say Socrates or Bucephalus, they do coincide; for I see no valid ground why we should not *think* in the strict sense of the word, or *conceive* the individuals which we *represent*."

A notion of all the attributes of the individual, which thus enables us to discriminate him from other individuals, is a generality, and thus properly a concept. There is the knowledge of other individuals in the discrimination, and thus there is a relation of resemblance amid difference. There is *this* individual as opposed to *that* and the *other*. *That* and the *other* are conceived as belonging to the same class of *individual*, but as discriminated from say *this*,—Socrates,—under the class. If, however, the attributes be viewed simply as belonging to this thing or individual—if that be possible,—there would be a mere image or representation, and no concept proper. But every object of intuition, and every part of every object, is necessarily thought under some kind of relation; there is no absolute or irrespective intuition, as there is no absolute or irrespective conception. But, as seems to me, the image of the individual and the concept of it in such a case do not coincide more than in the case of general notions or concepts proper. The concept of *individual* is as much a generality along with the definite individual attributes, as the concept of *horse* is along with the individual attributes of the representation.

§ 116. Thought proper or Concept cannot be imaged, that is, pictured in a single definite image or representation. For thus it would cease to convey general or universal knowledge, and become but the definite or determinate image of this or that individual object. A concept cannot thus be realised in consciousness in the mere representation of one moment, or of *one* object. A concept expresses a relation—a relation of similarity between several objects. It is thus not only not a single image, it is not even picturable in the imagination, but is conceived or understood as an intelligible relation between several objects, actual or ideal.

A concept, as such, is thus always only a potential knowledge, that is, there is no imaginable object capable of corresponding to its universality. Concepts may be realised "in relation" to some one of the individual objects they classify, and in this relation can be represented in imagination; but then, as so actually represented, they no longer constitute general attributions, they fall back into mere special determinations of the individual object in which they are repre-

sented. Thus it is, that the generality or universality of concepts is potential, not actual. They are only generals inasmuch as they may be applied to any of the various objects they contain; but while they cannot be actually elicited into consciousness, except in application to some one or other of these, so they cannot be so applied without losing, *pro tanto*, their universality."¹

(a) Occam has a very clear apprehension of the requisites of intuitive and representative or abstractive knowledge. In order to intuitive knowledge, all that is needed is the intellect and the thing known, and no species. In order to abstractive knowledge, there is needed something first besides the object and the intellect. Something is left in the imaginative power, through the mediation of the intuition of the particular sense, which was not there before. Otherwise no representation would be possible. But what is left is not a species, but a habit (*habitus*)—not the object of the act, but a certain habit inclining to represent the object formerly perceived (*sensatum*). *Simulacra*, *phantasmata*, *idola*, *imagines*, are not anything really distinct from things without, but indicate the thing itself in respect that it terminates the act of the internal sense in the absence of the sensible thing.—(*Sent.*, ii., *Dist.* 27, qu. 15 C. Prantl, iii. xix. 759.)

When it is said that the *intellectus agens* makes the universal in the act, this is true, because it makes something feigned (*factum*) and produces a certain concept in objective being, and in no way subjectively. (Subjective means in the subject as existing; objective, in the mind as intelligising.)

(b) Thomas Aquinas held, in regard to universal intelligible species, which the intellect gains by abstraction, that the intellect cannot actually (*actu*) understand them unless by turning itself to singular phantasms.—(Prantl, iii. 201.)

§ 117. What, then, it may be asked, does the general term precisely stand for or represent? It signifies or symbolises simply an individual image, which we consider as representing, though inadequately, the generality. We make this individual image stand for any or for every other which it resembles in those essential points which constitute the identity of the class. We cannot, for example, imagine the genus triangle, but we can imagine a rectangular triangle alone, or an equilateral triangle alone, or both together in separate representations. Conscious of their similarity in one essential feature, we may imagine only the one, and regard it as the (inadequate) representative of the other. The relation of similarity, however, we cannot imagine. It is wholly unpicturable, but we

¹ Hamilton, *Logic*, L. viii.

conceive it. When we have two objects before us or the images of the two individual objects, we can conceive it,—make it an object of intelligence or thought. This is conceiving or thinking in the proper and fundamental sense of the term. The whole confusion on this point has arisen from not distinguishing between the image and the concept—the *Anschauung* and the *Begriff*—as is done in German philosophy. There is the individual object or image: that is representable, picturable, in the imagination; there is the intelligible relation or similarity between two or more objects or representations; there is the consciousness of identity in the resembling feature; and there is the contemplation of the one individual image as possessing this feature, and, therefore, representing it in every other resembling individual.

§ 118. Thought, therefore, is the representation, through imagination, of a whole class of individual objects—actual or possible. This is the proper doctrine of Nominalism, at once true and self-evident. The completed act of conception implies at once the knowledge, the image, either of the individual object as presented in sense, or as represented in imagination, and the knowledge of the relation of resemblance between it and another or other individual objects, fused in one act of consciousness. As Hamilton puts it precisely and succinctly, and in a way that should have absolutely precluded misconception, “A concept or notion, as the result of a comparison, necessarily expresses a relation. It is, therefore, not cognisable in itself—that is, it affords no absolute or irrespectively object of knowledge, but can only be realised in consciousness by applying it as a term of relation, to one or more of the objects, which agree in the point or points of resemblance which it expresses.”¹ This, as he truly says, is the key to the whole mystery of generalisation and general terms.

(α) On this point reference may be made to the following passages as illustrating the doctrine of Hamilton:—

“The terms *notion* and *conception* (or more properly *concept* in this sense) should be reserved to express what we comprehend but cannot picture in imagination, such as a relation, a general term,” &c.—(Reid’s *Works*, p. 291, note.)

¹ *Logic*, L. vii. p. 128. See especially L. viii. pp. 134-136.

"*Imagining* should not be confounded with *conceiving*, &c. ; though some philosophers, as Gassendi, have not attended to the distinction. The words *conception*, *concept*, *notion*, should be limited to the thought of what cannot be represented in the imagination, as the thought suggested by a general term. The Leibnitzians call this *symbolical* in contrast to *intuitive* knowledge. This is the sense in which *conceptio* and *conceptus* have been usually and correctly employed."—(Reid's *Works*, p. 360, note.)

"Of all such [general notions] we can have no adequate imagination. A universal, when represented in imagination, is no longer adequate, no longer a universal. We cannot have an *image* of those, but only of some individual of that species. We may, however, have a notion or conception of it."—(Reid's *Works*, p. 364.)

"When abstract and general conceptions are 'particularised,' they thus cease to be *abstract* and *general*, and become merely individual representations. In precise language they are no longer *νοήματα*, but *φαντάσματα*—no longer *Begriffe*, but *Anschauungen*; no longer notions or concepts, but *images*. The word 'particularised' ought to have been *individualised*."—(Reid's *Works*, p. 365, app. 407.)

"A universal, when represented in imagination, is no longer adequate, no longer a universal. We cannot have an image of horse, but only of some individual of that species. We may, however, have a notion or conception of it."—(Reid's *Works*, p. 364.)

§ 119. This solves the problem of Nominalism and Conceptualism. The Nominalist showed that a notion could not be imaged or imagined,—that this, in fact, involved contradiction. The generality, therefore, they attributed to the name. The Conceptualist held that the object of thought was not simply a name, but a notion or intelligible object; but those conceptualists erred who supposed that this was cognisable by itself.

(a) "The whole controversy of 'Nominalism and Conceptualism' is founded on the ambiguity of the terms employed. The opposite parties are substantially at one. Had our British philosophers been aware of the Leibnitzian distinction of *intuitive* and *symbolical* knowledge; and had we, like the Germans, different terms, like *Begriff* and *Anschauung*, to denote different kinds of thought, there would have been as little difference of opinion in regard to the nature of general notions in this country as in the empire."—(Reid's *Works*, p. 412. Compare note, p. 360, and *Met.*, L. xxv. and xxxvi.)

The doctrine of Nominalism, rather Ultra-Nominalism, may be stated as implying that there is no science of universal things, but only of the common names of things. There is no connection of things among themselves,—all that exists is individual, isolated. There is no thing which is common with any other in nature; the community lies wholly in the vocables of the things themselves.

Conceptualism teaches that universals are mere concepts, or that

beyond the thought of man there is nothing universal in the universe of things, common to things among themselves. On the other hand, some conceptualists hold that there are universal things in nature, and that these have being *per se* (*obvius*), although they have not subsistence by themselves, but in singular things, and by them.

Realism implies that universals are not only common names, but principally things of common natures, which are first signified by common names. The Realists say, for example, that *animal* signifies some nature, in which *man* and *beast* agree. Thus the name *animal* is not only universal, but the *nature* animal is so.—(See Goclenius, *sub voce Nominales*.)

(b) According to the doctrine ascribed at least to certain thinkers, known as Conceptualists, we can form an idea corresponding to the generality of the class term. To this Hamilton in substance replies that if by idea or conception or notion be meant an image,—one image,—whether the product of sense, apprehension, or of imagination,—there can be no one image corresponding to the general term, for the simple reason that such would be contradictory, self-annihilating. Take, for example, the notion *man*. An image adequate to the generality of this notion would necessarily include *male* and *female*, *black* and *white*, *copper-coloured*, *tall* and *short*, &c. Nay, it would need to represent all and none of these,—it would need to be absolutely general as the class, and yet not be identifiable with a single individual of it. This is a manifest impossibility, an absurdity. In the same way an image adequate to *triangle* must represent both rectangular and equilateral triangle, and yet neither of these at the same time. There is thus in the attempt even a twofold violation of the law of non-contradiction.

In this connection Hamilton acutely exposes the fallacy of Brown's doctrine of the generality of the notion as lying in "the feeling of resemblance," and also his inaccurate statement of the Nominalist doctrine. Brown criticises the Nominalistic doctrine, on the ground that it omits what he calls "the feeling of resemblance" between the objects of perception or conception classed under the same common name,—omits thus the essential element of the true theory, and leaves it impossible for us to limit the application of the term to a definite set of objects.—(See Brown's *Lectures*, xlv. and xlvii.) On the historical point, Hamilton shows that with the Nominalists universally—with Hobbes, Berkeley, Hume, Adam Smith, Campbell, and Stewart,—apprehended resemblance between the objects is the ground of classification, and the reason of the name. What the Nominalists deny is, that this conception of similarity could constitute a general notion. And Brown, in making this a general notion, is himself wrong. Resemblance is a relation; a relation supposes certain objects as related terms; the resemblance must be in some particular mode or quality, as colour, figure, &c.; and the resemblance between two individual objects in a determinate quality is as individual and determinate as the objects and their resembling qualities themselves. The likeness, for example, between a particular snowball and a particular egg is not more general than the representations of the several

objects. Brown's mistake arises from the lack of an accurate distinction between the image, product of apprehension or imagination, and the concept proper which, as involving a relation, is not picturable in imagination at all, but the object of the intelligence or understanding, though not such an object *per se*, or apart from the images of the related objects. And this mere relation of resemblance between any two given objects is not more general, though unpicturable, than each of the individual objects themselves. In the face of all this, Mill actually assumes, as Hamilton's opinion, that the relation can be thought *per se*, and that it can thus be thought as general, and uses against this opinion, though without acknowledgment, the arguments employed by Hamilton against Brown's views.—(See *Examination*, c. xvii. pp. 318, 319.)

Hamilton here has not expressly distinguished the extension and the comprehension of the concept, and it seems to be the former aspect of it which he contemplates, in showing the impossibility of forming an adequate idea or image of it. The question may be asked, Are we equally unable to image or picture adequately the simple abstract quality, or the sum of attributes which makes up the comprehension of the concept? This question, I think, Hamilton intends also to answer in the affirmative; for he agrees with Berkeley in holding that it is impossible to form abstract ideas of extension, motion, or colour.—(*Met.*, L. xxxv. pp. 298, 299.) "It is impossible," Berkeley says, "for me to form the abstract idea of motion distinct from the body moving, and which is neither swift nor slow, curvilinear, nor rectilinear; and the like may be said of all other abstract ideas whatever." This is true of the idea of colour in the abstract; for this idea as purely abstract would be neither red, nor blue, nor white, nor any other determinate colour. In the case, then, even of the attribute or attributes called abstract, there is the individual image or picture of some determinate form of the attribute, the reference of it, in fact, to an individual subject. We cannot think the comprehension apart from some degree or form of the extension—that is, we must always individualise the attribute. This is made perfectly clear in the *Lectures on Logic* (Lect. vii. pp. 128, 129), where we are told "that it is altogether impossible to represent any of the qualities expressed by a concept, except as attached to some individual and determinate object; and their whole generality consists in this, that though we must realise them in thought under some singular of the class, we may do it under any." This means, in fact, that along with the comprehension of attribute, we must always realise some part of the extension, some one object, contained under the class. But it has nothing to do with the circumstance of other attributes of the individual, as Mill seems to suppose.

(c) Hamilton in several places speaks of the distinction in German nomenclature of *Anschauung* and *Begriff* as corresponding to the Leibnitzian distinction of Intuitive and Symbolical Thought.

Anschauung, as standing for the presentation of sense and the representation of imagination, as Hamilton says (*Logic*, Lect. x., iii. p. 183), can hardly be identified with the Intuition or Intuitive Thought of Leibnitz. The latter is equivalent to more than the mere presentation

or representation; it includes thought, and its function as representative of a class of objects—*e.g.*, the intuition or representation of a triangle, that is, of all knowledge of the individual figure and its attributes, and the holding it also as the representative of all similar figures. This is the proper sense and use of the concept. Symbolical thought, again, with Leibnitz, takes place when we do not image all, or realise any of the attributes, but put a name in their place, and think and reason by means of this. Hamilton fully recognises this kind of thinking. But he does not regard it as the only form, or the first or best form. And when he speaks of the *Begriff* as appropriated to “the symbolical notions of the understanding in contrast to the intuitive presentations and representations of imagination,” he is not to be taken as meaning the symbolism of the word or name, as Mill assumes, but simply, what he says, the symbolism or representative character of the notion as opposed to the mere intuition of sense or the mere representation of imagination, which agree in being alike individual and immediate.—(*Logic*, Lect. vii., p. 127.)

(d) Hamilton's doctrine on the nature of the Concept seems throughout clear, uniform, and consistent. But Mill, as usual, will have it that he holds two opposite doctrines, which his critic calls Nominalism and Conceptualism. But Mill's entire criticism of Hamilton's theory of Concepts is a mass of misrepresentation and confusion. He attributes to Hamilton the doctrine that the concept can be thought separately by the intellect, and at the same time that it cannot be depicted separately from the individual in the imagination. He wholly fails to recognise Hamilton's distinction of image and relation, the connection of imagination and comparison in the act of thinking or application of the concept. Hamilton, as we have seen, holds that there is no mere or absolute concept of a class, whether taken in extension or in comprehension. He thus denies the so-called or alleged Conceptualism of Locke and others. This with him is utterly unrealisable in thought. There is no generality of this sort. On the other hand, he holds that while the image or determinate representation is essential to the application of the concept to objects, this is not the whole of the process, but the condition under which we think the relation of the image or determinate object to others of the class, or others possessing the common feature. The mere image is as little the concept as the mere relation of resemblance is. Each is equally individual, particular; but fuse them in one complete act, and you have thought proper, or thinking by means of the concept. Of all this Mill has not a single glimpse; and the result is a mass of thoroughly irrelevant criticism.

In the first place, Mill entirely mistakes the individualising of the concept—“We can only be conscious of them [the attributes said to compose the concept] as forming a representation jointly with other attributes which do not enter into the concept.”—(*Examination*, p. 402.) If by this Mill means that other attributes of the one representation are convertible with the individualising of the concept, the doctrine is neither that of Hamilton, nor of truth. A concept may be individualised when there is but one single attribute in the objects of the class, or where there are no attributes besides those contained in the concept;

when, in fact, the individual as existing, and the individual as conceived, are convertible. This holds true of nearly all our most abstract conceptions—such as *Space*, *Time*, *One*, *Being*, and of all singulars as conceived. To individualise the attribute or attributes of a concept is not to represent it or them in connection with other attributes of the (existing) individual; it is merely to form one image or representation in which the attribute or attributes of the concept are embodied. This we do by forming for ourselves a present image or individual object, the image at a given or definite time—*now*.

In the second place, on the assumption that on Hamilton's doctrine "concepts are incapable of being realised in thought at all, except as representations of individual objects," Mill asks, are they, even, "potentially universal," as Hamilton puts it?—(*Examination*, p. 389.) Hamilton, as we have seen, in no way limits the realisation of the concept in thought to the mere representation or image. It is not with him "always the mere part of a concrete image." This is but the condition, not of representing, as he says, but of our conceiving the relation of resemblance, which is at the root of the whole. In this conception there is a potential, as opposed to an actual universality; for we are able successively to conceive, always within the limits of the resemblance, other objects, and so predicate the common quality of them. Mill, however, tells us that here we have not "a potential universality," but "an universal potentiality." The "universal potentiality" of the concept is about the oddest property ever attributed to it,—it is universally capable of everything, but universally incapable of any one thing.

In the third place, if Mill had kept in view the fact that, according to Hamilton, a concept is no absolute object of thought, he would hardly have been puzzled to reconcile Hamilton's statement of wherein the clearness of a concept lies, and some words which he borrows from Esser as to the same point. "A concept," says Hamilton, "is said to be *clear* when the degree of consciousness is such as enables us to distinguish it as a whole from others. . . . *Distinct*, when the degree of consciousness is such as enables us to discriminate from each other the several characters, or constituent parts, of which the concept is the sum."—(*Logic*, L. ix. p. 158.) In illustration of this, which is from Krug, he quotes from Esser the following: "A concept is said to be *clear* when the degree of consciousness by which it is accompanied is sufficient to discriminate what we think in and through it, from what we think in and through other notions."—(*Logic*, L. ix. p. 161.) This to Mill is a wonderful and puzzling discrepancy, and shows that "our author had no clear conception of what makes a conception clear."—(*Examination*, c. xvii. p. 413.) It is only wonderful, because the critic had no "clear perception" of the fact that Hamilton did not recognise any separate or absolute concept realisable apart from the object thought in or through it; and that he supposed, when he spoke of the concept being distinguishable from other concepts, that people would remember this, and rightly judge that the two expressions are precisely convertible, or at least mutually implicative.

Fourthly, wonderful to relate, Mill goes the length of admitting that "the true theory of concepts needs not, I think, be sought further than

in our author's own account of their origin"—(*Examination*, p. 392); but presently, as if this were too generous, he adds: "But his theory is a complete condemnation of his practice. . . . He affirms that Nominalism and Conceptualism are the same, and on this justification expounds all the operations of the intellect in the language of Conceptualism, and on the assumptions of Conceptualism." Hamilton has never affirmed that Nominalism and Conceptualism are "the same," though, if he had, a good deal might be said to show that it is in the main, or substantially, true. But, taking them as two theories, Hamilton shows that there is truth in each, and showing what this truth is, brings them into complete harmony by his own doctrine. And on the basis of the reconstructed theory, he uses language which only such a critic as Mill would distort as exclusively conceptual.

Mill asks, "Is it correct to say that we think by means of concepts? Would it not convey both a clearer and a truer meaning to say that we think by means of ideas of concrete phenomena, such as are presented in experience or represented in imagination, and by means of names which, being in a peculiar manner associated with certain elements of the concrete images, arrest our attention on those elements?" Sir W. Hamilton has told us that a concept cannot, as such, be "realised in thought," or "elicited into consciousness." Can it be that we think and reason by means of that which cannot be thought, and of which we cannot become conscious? To the latter question any tyro would answer that the same argument would prove that because we cannot think the half of a whole by itself, or as such, we must think the whole by means of that of which we cannot become conscious. The same tyro might answer to the first question, that if we have only the idea of a concrete phenomenon, and the name of parts of the concrete image, we cannot think at all, seeing we should never be able to say whether any other idea or any other phenomenon agreed with or differed from the first—never, in a word, be able to perform the first function of thought—discrimination—name the part or the whole as we please. Thinking by means of names—the symbolical thinking of Leibnitz—is putting names "in lieu of notions." This is a kind of thinking fully recognised by Hamilton; but it is recognised by him and others as possible only because there is another sort of thinking in the first place, and at the root of the whole—viz., intuitive thinking, or thinking through a definite representation of the attributes conceived as common to the class. We may think symbolically, but we must be able to think intuitively, or by means of the image *plus* the conceived relation; ere even symbolical thinking can be regarded as symbolical of anything. And did we only think symbolically, we should have no test either of clearness, distinctness, or even truth in our thinking. We could never bring it to the test of experience, or lend it the enlightenment of intuition. It would be literally "blind thinking"—the blind leading the blind.

(On Mill's chapters on General Conceptions, Judgment, and Reasoning, the reader may refer to an admirable criticism in *Hamilton versus Mill*, a publication of which, unfortunately, only two parts appeared (Edinburgh, 1866). The exposure of the sophistries of the criticism in those chapters is most thorough.)

CHAPTER XI.

THE CONCEPT—ITS CHARACTERISTICS SPECIALLY CONSIDERED—COMPREHENSION AND EXTENSION — RELATION TO LANGUAGE — INTUITIVE AND SYMBOLICAL THINKING.

§ 120. It follows from what has been said on these points that every concept has a double or twofold side. As embodying the idea of an attribute or attributes, it has a meaning, content, or comprehension (*Inhalt*). As through the attribute or attributes applicable to several objects, it has a compass, breadth, or extension (*Umfang*). It takes in objects or classes: in the former aspect it indicates attributes, in the latter it denotes objects; but it cannot denote unless it first of all indicate or connote.¹ So that connotation is the ground of denotation—comprehension is the ground of extension. In the notion *Man*, the attributes *life*, *sensation*, *reason*, *free-will* make up the content or comprehension; in the same notion, *white man*, *black man*, *copper-coloured man* make up the extension.

The attributes in the comprehension of a concept are fixed; these do not vary. But the species, classes, or individuals contained within the extension, vary according to our principle of division. The specification now given is according to colour, but we may divide *man* equally well according to nationality. Here we should speak of *Englishman*, *Scotsman*, *Frenchman*, *Prussian*, *Russian*, and *Turk*. Or we may divide *man* according to his religion, as *Mohammedan*, *Christian*, *Buddhist*. Or under *Christian* we may take *Papist*, *Presbyterian*, *Lutheran*. The comprehension is thus invariable; the extension is variable, according to the principle of division,

¹ For the proper use of this word see below, p. 173.

which of necessity introduces a new attribute external to the comprehension of the notion divided.

As has been well pointed out,—in reply to the question, *What is an object?*—we speak in comprehension. *What is art?* It is *skill in production*. *Which are the arts?* The answer is in extension. *Painting, Sculpture, Architecture, &c.*, are arts.

§ 121. The inadequacy of a concept as a representation, already noticed, is increased in proportion as the width of the extension of the concept is increased. Thus, take the individual—say Sir Isaac Newton. First, I represent him as *astronomer*. This implies or connotes certain attributes, as that he is *man* and *intelligent*; but it does not give me the individual Newton. It leaves out *Englishman, Master of the Mint, Professor of Mathematics*. Newton may be astronomer, though he is none of these. Astronomer applies to him only in one relation, and in this relation it might apply to, *i.e.*, represent, a hundred men besides.

Then, if I represent him simply as a *man*, the less do I think of his proper individuality. I have given up even what is distinctive in astronomer; for he might be the former, and not the latter. If I think of him simply as *existing* or *being*, my notion of him falls still short of the individual. In a word, the more extensive my view of the individual or his qualities, the less adequate and the more faint is my picture of the individual. In technical language, the more extensive my knowledge, the less comprehensive is it,—the less does it hold the features of the individual.

Thus, let X = astronomer, and A, B, C, D, E, the other qualities of the individual Newton not implied in X. These taken together make up a perfect image of him. When I think of him as one of the X's, I do not think of him—*i.e.*, necessarily think of him, as A, B, C, D, E. My knowledge of him, accordingly, as given in the concept X, is less than an adequate representation of the individual by A, B, C, D, E.

§ 122. The neglect of attention to this distinction in our concepts leads to the blank of thought itself, to mere verbalism, to using terms which are literally nonsensical. And it is the source of nine-tenths of our controversies; for unless we first of all ask ourselves and our opponents what precisely each means by the term to be applied to an object—what is its comprehension—it is obvious that, as

opposing parties, we may be fighting absolutely in the dark. We may literally attach no meaning to the word we use, or each of us may attach a totally different meaning to it, and so be in agreement, while we suppose we are in mortal conflict. Definition,—the unfolding or explication of the comprehension of terms,—is the first requisite to clear and distinct thinking in our own minds, and it is essential to the understanding of the position of other people.

(a) In the view of the concept now given, I have regarded it as identical with what other writers call the *General Conception*, *allegemeine Vorstellung*, *schema*, *notio*, *conceptio*, *representatio communis*, or *generalis*, or *universalis*. But concept or notion has been taken by some logicians in a narrower sense.

We are told by Ueberweg, for example, that the notion (*Begriff*, *Notio*, *Conceptus*) is that conception in which the sum total of the essential attributes, or the essence (*Wesen*, *essentia*) of the object under consideration is conceived. By the phrase—*attributes* (*Merkmale*, *Nota*), of the object we include not only the outward signs by which it is known, but all its parts, properties, activities, and relations,—in short, whatever belongs in any way to the object. The essential (*essentialia*) are those attributes which (a) contain the common and persistent basis for a multitude of others; and on which (b) the subsistence of the object, its worth and its meaning, depend. . . . Attributes are also called essential which are necessarily united to marks essential in the stricter sense, and whose presence, therefore, indicates with certainty the presence of those others. . . . The other characteristics of an object are called non-essential (*accidentia*, *modi*). The possibility of *modi*, or the capability to take this or that modification, must have its foundation in the essence of the object. . . . In perfect knowledge, notions are valid only as they correspond to the types of the real groups of their (natural or mental) objects. . . .

We recognise and distinguish the essential (a) in ourselves immediately by feeling and mediately by ideas. . . . The knowledge of our own essence depends both on the consciousness of the ethical ideas, and on the amount of our actual existence in them.

(b) By means of the knowledge of the essence in ourselves, we recognise the essence of persons beyond us more or less adequately in proportion to their relationship with ourselves. . . .

(c) The essence or the inner purpose of nature is the analogue of the ethical duty of man, and is to be known in the proportion of this analogy. . . .

(d) With the inorganic objects of nature, existence, as an end in itself, and self-determination, come after existence as a mean for another, and the mechanically becoming determined by another.—(Ueberweg, *Logic*, p. 153.)

The construction of a notion "purely according to objective laws, on the basis of what is most essential for the object in itself," is the problem of science, in its various departments. It is not the problem

of any one science; and its laws are simply those treated of in Inductive Logic. To define notion as identical with the knowledge of essence, is to be guilty of narrowness in definition, or to abuse the term. It is, besides, to miss the essential character of the notion itself, and to pass beyond the whole laws of thinking 'ultimate in the construction of a notion *quâ* notion. When we ask—"According to what marks are objects to be grouped together and their notions formed?"—what are the marks of the essential as distinguished from the non-essential or accidental attributes?—there are really two questions involved. (1.) What kind of attribute is essential? (2.) What attribute in a given case is essential? An answer might be given by logic proper to the former question,—in saying that an attribute is essential when it is of such a kind that the object in which it inheres would not be, or not be what it is, in its absence. Such an attribute is *extension* in body. This would further fulfil the test of being the permanent ground of other derivative attributes,—such as *figure*, *position*, directly; and *colour* indirectly. It will be found, however, that the application of such a test is limited really to necessary concepts. When we descend to the properties of individual objects, and to the classes of things, we may go back a certain way and find grounding attributes, but we can never be certain that these are the ultimate and thus the absolutely essential. What attribute in a given case is the essential one? Shall we say that it is that without which the object could not be? But then this supposes that we have already defined the object in its essential character. Shall we say that it is an attribute which affords a permanent ground for other attributes? But can we call this properly essential, or constitutive of the being of the object, *quâ* object? Suppose we know, as we only can know, by observation and induction, what, then, is to be our test of the essential in an object as compared with the accidental? Suppose this test is, that at a given point in the history of physical science we find certain attributes prior to others in the order of nature, on which those others depend, are we at once to say that these are the essential attributes of the object? If so, what happens when we find, through further analysis, that those so-called essential attributes are themselves dependent on others?—are themselves derivative? And ~~where~~ ^{where} is this process of analysis to stop? Can we at any time say that we have found the essential attributes of any object, taken objectively? Or rather is it not the case, that in every stage of inductive inquiry we can only say that we have found attributes prior to others, but the ultimate and permanently essential still necessarily escape us? Could we get at the *prius* of all the objects of our sensible experience, or of even one object of that experience, then, and then only, could we determine the essential attribute or attributes of the object. In fact, the term *essential*, as objectively implied, has properly only reference to hypothetical constructions, in which we deal with a limit subjectively imposed, or to mathematical constructions in which the grounding concept of extension, necessarily conceived, is modified by us according to certain implied requirements, by means of definition. *Line*, *surface*, *triangle*, *square*, can each be given in its essence, but this only ideally, for there are metaphysical questions regarding the *prius* of

extension itself. And the true essence may, probably does, lie in unity of force behind the whole of the extended world.

§ 123. But concepts are naturally expressed in Terms. This leads to the consideration of the relations between thought and speech. The essential element in human speech is its symbolical character. Words are the signs or symbols of intelligence, or rather of the products of intelligence as a mental act. Intelligence is essential to the formation of language, and is in exercise previously to the production of the word or sign. The faculty of language, which depends partly on the organs of speech and the power of producing sounds, is obviously natural to man, as his intelligence is. But the faculty comes into play at the prompting of intelligence, and in order to satisfy the needs of human consciousness. Intelligence is thus the principle and the source of language. Its conditions are given us in our physical organisation: but no arrangement of mere articulate sounds can constitute human language; for its essential characteristic is, that it is symbolical of meaning or thought. Speech is not merely a series of words, but a series of word-signs expressive of thought, feeling, desire, and will.

§ 124. The necessity for language appears to arise at the point of our earliest generalisation—even our earliest abstraction, which is made general. We need a sign for that feature, or those features which several objects present in common. The moment we begin to generalise, that moment do we give expression by the word or term. The process of forming notions is one of disengaging an attribute or variety of attributes from the individual objects of perception. This amounts to disconnecting those attributes from definite conditions of time and place. We have, therefore, recourse to the word or term, which comes in the place of the individual object of perception, and serves as a point or termination for the generalising intellectual act, and further, as a *nexus* which binds the abstracted attributes together. In virtue, therefore, of the principle of association by which one object suggests or recalls another that has once been connected with it, the word brings before us in all time the attribute or sum of attributes marked, or it recalls to us some individual object in which these attributes are embodied. We thus by association connect the word and the concept, and by the

same principle we are enabled to bring back our notions to remembrance.

§ 125. The first stage in the process that leads to naming seems to be that of fixing on or abstracting, as it may be called, an attribute amid the complexity of attributes presented to perception. This is the first arrest of intelligence—the concentration of consciousness on one out of many of its objects. This arrest of intelligence is many-sided; and it is strong as the powers of the world around us. It is bright and vivid as that world is clear and intense. It is varied as the wide sphere of nature itself. In this stage, however, we do not at first need language, and we do not use it. The thing known is before us as a reality; and while this is so we do not need to name it. The perception is fixed on the percept; the percept stands for both thing and name.

§ 126. But there comes a time when this quality perceived is no longer present to the mind, present in time or in space. Its reality has become a thing of the past; yet it is a memory. And other impressions arrest the perception; but the understanding is vigilant, and it apprehends relations of resemblance. The quality originally perceived passes into the term of a relation, and we have now the ground of the general abstract. But this is an idea, a concept, or thing in the mind, and it would pass away but for the name. The name thus becomes the outward or sensuous sign of the dim abstract; the kind of familiar friend of our thought, which fixes and keeps it, on which, as it were, thought leans. What was originally perceived, but not named, becomes *roundness*, or *squareness*, or *redness*, or *whiteness*, or *blackness*—this *ness* indicating *being* in each case to begin with, and this *round* or *square* indicating the kind of quality perceived in each case. This gives us the *abstract noun* or name, perhaps the first or earliest of names; for quality precedes the notion of class, and grounds it. *Class* means simply similarity of quality in things, and every quality in an object is capable of raising that object to a member of a class, because the quality may be found in other objects.

§ 127. The third stage is that of the *class*, or *concrete common name* or noun. This means that a great number of things or objects is grasped under a common relation of resemblance. We drop the *ness*, as it were, or whatever stands for the abstract quality; and we have the common concrete,—

the *round* and the *square*, the *red* and the *white*,—that is, we have the names of classes of things; and to the name we transfer, as it were, the burden of thought—the burden of the whole indefinitude of individuals comprised under the name. It is now in the generality of thought, when we have passed from perception, and the real before us, that we have recourse to the name, and thus designate the generality of abstraction. To me it appears that the abstract quality is first named as *innerness*, or *hollowness*, or *redness*, or *whiteness*; and then, by a more concrete form of thought, the common term arises, and we name not so much the quality, as the things possessing it, by *inner*, *hollow*, *red*, or *white*—that is, we get the class-name.

§ 128. The concept may be said to be imperfect until it is named, expressed, and fixed in a verbal sign. Concepts are far from being mere words,—*flatus vocis*; the word is but a sign of thought, and the thought is there before it can receive the sign. “Speech is not the mother, but the god-mother of knowledge.” Yet it is true “that we could never have risen above the very lowest degrees in the scale of thought without the aid of signs.” The concept is rendered “permanent for consciousness by being fixed and ratified in a verbal sign;”¹ and the thought it indicates, from being embodied in the term, gains in clearness, distinctness, and definiteness.

(a) The generality of the concept does not lie in a community of name. It is not the essence of the word, says Abelard, as word, which can be attributed to several; the vocal sound which constitutes the word is always actual and particular each time it is pronounced, and not universal, but it is the signification one attaches to it which is general.—(Abelard, *Glossulae s. Porphyrium*—(Remusat)—Prantl, ii. 175.)

§ 129. This is the primary and normal relation of words and names to concepts. But there is another relation. It frequently happens that, in the employment of the word or sign, this does not suggest the whole amount of thought for which it is the adequate expression. On the contrary, we frequently give and take the sign, either with an obscure or indistinct consciousness of its meaning, or even without an actual consciousness of its signification at all.² This was the point insisted on by Leibnitz in the now well-known distinc-

¹ Hamilton, *Logic*, L. viii., vol. iii. pp. 137, 138.

² Hamilton, *Logic*, L. x., p. 172.

tion between Intuitive and Symbolical Thought. The latter is a common form of thinking; we use names for concepts, believing that we can unfold the meaning at will. It is necessary for rapidity in thinking; it is necessary also in cases where we cannot actually depict to the mind every point or individual element of the concept, as in large numbers, where we proceed through aggregates regarded as units. But it is a frequent source of error, and often a cloak for absurdity. The actual unfolding of the meaning or attributes in the imagination—intuitive thinking—is the necessary corrective in ordinary cases of this “blind thinking.”

§ 130. In the case especially of a complex concept, that is, a concept which involves a considerable variety of attributes, we do not stop each time we use the term which denotes it to realise fully to the mind each and all of the attributes contained in it. We habitually employ general terms without fully, or even in any considerable degree, realising their meaning. When we speak, for example, of *Government, Church, State, Constitution, Commerce, Jurisdiction, &c.*, we do not on each occasion of their use unfold to our mind all the constituent elements of the notions indicated by those terms. And yet we employ them appropriately enough. Were one of these terms substituted for another in a discussion, as Hume has remarked, we should at once detect the incongruity.¹ We employ these terms without articulately unfolding the full meaning of each, with a conviction that it is in our power to do so if required. We can carry out a process of thought in this abbreviated form; and as such it is called *symbolical*, seeing that we make use of symbols as substitutes for the contents of notions. The process might appropriately be called *shorthand* thinking. When, on the other hand, we actually realise to the mind all the attributes contained in a notion, our thought is said to be *intuitive*; for the moment we depart from conception that is purely symbolical, we call up before the mind an individual representation or embodiment of the attributes contained in the concept,—taking this representation at the same time as the type of the class.

(a) This distinction of knowledge, or rather of thought, as intuitive and symbolical—one of the most important analyses at once in psychol-

¹ *Treatise of Human Nature*, i. 7.

ogy and in Logic—was taken by Leibnitz, in a paper published by him in 1684, entitled *De Cognitione, Veritate, et Ideis*. “For the most part,” says Leibnitz, “especially in an analysis of any length, we do not view at once the whole characters or attributes of the thing, but in place of these we employ *signs*, the explication of which, into what they signify, we are wont, at the moment of actual thought, to omit, for the sake of brevity, knowing or believing that we have this explication always in our power. Thus, when I think a chiliogon (or polygon of a thousand equal sides) I do not always consider the various attributes of the side, the equality, and the number of a thousand, but use these *words* (whose meaning is obscurely and imperfectly presented to the mind) in lieu of the notions which I have of them, because I remember that I possess the signification of these words, though their application and explication I do not at present deem to be necessary: this kind of thinking I am used to call *blind* or *symbolical*. We employ it in algebra and in arithmetic, but in fact, universally. And certainly where the notion is very complex, we cannot think at once all the ingredient notions; but where this is possible—at least, inasmuch as it is possible—I call the notion *intuitive*.”—(Quoted, Hamilton, *Logic*, L. x.)

§ 131. Symbolical knowledge may thus not inaptly be compared to a bank-note. We accept and pass a note—say £1,—from hand to hand without considering each time we do so how many shillings, sixpences, or pence the piece of paper represents. We do not unfold to the mind the exact constituents of the value represented by the note. This is analogous to our use of general words. We employ general terms without forming to our minds an exact representation of the various attributes indicated by them, just as we do not consider each time we pass a note that it stands for 240 pence. The process is in both cases an abbreviation of labour, and is, in both cases, a symbolical act. We should render this symbolical act intuitive, if, instead of blindly passing the mark or symbol as a substitute for the things represented, we set about counting the money* represented in the one case, or picturing to our minds the attributes represented in the other.

§ 132. It is thus obvious that we may have two kinds of objects fitted to stand as the type of a class of things. We may, in the first place, make the representation of any one individual of a class stand for all the other individuals of that class, by considering only those points which it has in common with those other individual objects. In this case we fully realise the contents of our concept or notion. Leibnitz

would call this an *intuitive thought*, not that it is merely an intuition, but that it is an intuition constituted into the type of a class of objects; it is, in fact, an intuition and a thought. This is the highest and best form of an act of conception, and is that towards which, on all occasions, we ought as much as possible to strive.

In the second place, we may take the symbol or term which denotes the concept or notion, and rest satisfied with it, without fully realising the contents of the notion—unfolding them before the mind. This term, from its application and associations, designates equally any one of a class of individual objects, and only the individuals of that class. Whatever, accordingly, we think as applicable to the symbol or involved in the symbolical knowledge, we regard as applicable to any one and to all of the individuals which it represents. We have an illustration of intuitive thought in the case of Geometry. Here our reasonings refer to an individual diagram, regarded simply as representing all the possible figures of the class to which it belongs. We have an example of symbolical thought in the case of Algebra, where the process of investigation is carried on entirely by means of symbols, representative, it may be, of a quantity which, during the process, is regarded by us as entirely unknown or indefinite. In Algebra, for example, to quote a case, you may take the division of unity into any two parts. Here it is shown that the difference of their squares is equal to the difference of the parts themselves. It does not matter what the numbers are. Letters will represent them. This is a universal law or formula which is worked out, in total unconsciousness of definite pictures or images attached to the terms.

§ 133. This distinction of symbolical and intuitive knowledge has a very wide and important application. There are cases in which symbolical thinking is an absolute necessity. Think of the difference between the idea of a figure of 1000 sides, and that of a triangle or figure of three sides. The latter we are able quite well definitely to imagine, to picture. The other we cannot; but we know what it means. And how so? As appears to me simply by repeating units, which we know or can picture. Five and ten we can picture, 100 we can hardly; but we can realise the 100 through the five or ten.

As we go on to 500, to 1000, the thought grows more dim as a picture, yet our knowledge is exact enough, because we go on forming units of which the larger number is composed. When I am told that the distance of the sun from the earth is 92,400,000 miles, or that the mean distance of Uranus from the sun is 1,754,000,000 miles, I confess that I cannot picture either of these distances to my imagination. I cannot make what is called an intuitive thought of it, yet I know it in a symbolical and even definite manner.* In the same way, when I am told that light travels at the rate of 186,000 miles per second, and thus traverses the distance from the sun to the earth in eight minutes, I have but a symbolical or unpicturable knowledge; yet it is all the knowledge I can have in the case. We must be content to think those numbers through the repetition of picturable units merely. We may picture or construe to the imagination so many units—say five, ten, fifteen, twenty; but after that, each of these sums is itself regarded as a unit, and thus becomes the basis of a higher calculation or concept. And there is no reason why twenty units should be regarded as less a unit than one. The *twenty* is virtually one,—one as against everything less or more than itself,—a true unit; and we may thus add or repeat this unit, as much as any smaller unit we know. Algebra all through is very much this kind of knowledge; geometry, as I have said, is not so; for at each step we have the picture of a figure before us. For this reason, algebraic training is not so good a mental discipline as geometry; and both are inferior as means of culture to the study of the sciences of intuition, or of fact and probability.

§ 134. It is possible to carry on long trains of reasoning in this the symbolical method. In fact, it is the most usual of all methods. But it is this circumstance which mainly allows contradiction and absurdity to escape us, which otherwise we should at once detect. It explains, indeed, how so much is written and accepted as true, which, nevertheless, we are totally unable to conceive, or even render intelligible. When contradictory propositions are stated in terms, whose meaning we fully apprehend, the contradiction at once flashes on the mind. This would be the case always, if each of our terms were fully and definitely understood. But as we use terms symbolically, we may and do employ

terms of contradictory import, form these into propositions and reasonings, accept the conclusion as valid, without being at all aware of any incongruity. Yet when our reasoning encloses a contradiction, however cloaked or concealed, the whole process is absolutely null ; it is, in a word, nonsensical or meaningless. To accept the meaningless for the meaning, non-sense for sense, is one marked danger of purely symbolical thinking. A frequent use of definition, and the substitution of intuitive for symbolical thinking, are our main safeguards against contradiction and confusion in any discussion.

CHAPTER XII.

THE LAWS OF THOUGHT : IDENTITY—NON-CONTRADICTION—
EXCLUDED MIDDLE—DETERMINING REASON.

§ 135. If there be in thought form essential and universal, this must depend on law necessary in thinking. If, whenever we think, or in whatever we call thinking, there is a type to which the act of thinking conforms, in order to its very existence, then this type must depend on a law, that is, a rule so uniform and general as to amount to universality. The matter of our thinking varies indefinitely; rules of generality may apply to it; difference does not destroy the matter of thought. Variation from form destroys form,—destroys, in fact, thought itself. Hence the law which regulates this unchanging form must itself be an unchanging law,—dependent, that is, on the very nature of the thinking subject,—necessary, universal, and thus essential to the very being and act of thinking.

§ 136. The unchanging character of the form of thought proves the necessary character of the law of thought; this, again, proves the unchanging character of the form of thought. We may either say that thought as form is necessary, unchanging, universal; or that the law of thought is so. The form is the concrete embodiment of the law; the law is the abstract statement of the form.

§ 137. The laws of thought are usually divided into the contingent and the necessary; but the latter alone are the proper laws of thought. We may think successively in various spheres of knowledge, or of various objects. Where the objects of thought differ, the laws or conditions of our thinking them differ also. Thus we may think a state of

consciousness; we do so as in time, as contrasted with a past state, and as void of dimensions. We may think an object of sense,—quality or percept. This we think not only as now or in time an object of thought, but as in a particular space related to an object or objects in co-adjacent spaces. It is contingent whether we think the sensation or say the sun-dial: and therefore the conditions under which we think in each case are in so far contingent. These may metaphysically or really become necessary to the thought regarded as the thought of the given object; but there being no necessity for our thinking the determinate object, there is no absolute or universal necessity of the condition upon our thought. These are therefore for thought itself contingent laws or conditions. They apply only if we happen to think of certain or determinate objects.

But the laws proper of thought are necessary laws. In other words, thought of any object is impossible apart from them. They are the laws of thought as thought. Whatever be the object we think, we must think it as identical with itself, as in absolute contrast to its contradictory correlative, and that on pain of the annihilation of the thought itself. Apart from the contingent conditions of thinking, certain acts of thought would not be; apart from the necessary conditions of thinking, no act of thought would be. The laws of thought thus imply a certain abstraction from objects. To them the object is as to its real nature or characters indifferent. Some object there must be in order that the law may be manifested in exercise. But any object is all that is needed. They bear the same relation to the objects of experience which the laws of universal grammar bear to the words of different languages. They contain the intelligible forms of the objects, the principles of universal grammar embody the possible combinations of the words which constitute intelligible, that is, possible speech.

§ 138. At the same time these laws are inaccurately described as independent of all experience. They are not so, either as to their known origin,—the possibility even of their conception by us, or of their realisation in our consciousness; for this always supposes some instance, either given in experience or created in the interest of pure thought by the imagination. They are independent of experience only in

the sense of not being merely generalisations from experience, but conditions even of its possibility as elements correlative with the matter. Logic is thus the science of the form of thought, that is, of the laws of the form of thought, or thought in its utmost generality, as dependent on, or as the expression of, necessary law.

§ 139. The fundamental virtue of the form of thought is the consistency of thought with itself. Thought postulates this in order to its very existence. Thought radically inconsistent is null; it is not thought,—it is merely words. Necessary connection is the higher virtue of thought. This, however, is something that follows upon and is superadded to consistency. Consistency is shown when we can think a notion without self-destruction. It is the bare possibility of a notion.

§ 140. The consistency of thought with itself needs explanation. This implies (1) *itself*—a definite thought (concept), consisting of a definite mark or marks, to begin with. Whatever transcends definite thought transcends logical law. The limitation of a concept depends on its constitution through its marks or attributes. The predicate *itself*, or *self*, or *in self*, is utterly inapplicable, unless to a definite concept or notion.

The laws of thought are thus, in their logical import, applicable only to definite thought. There must be a concept constituted ere any of them can come into play. They are in the movement of constitution; but they are fully realised and applied to the concept or product of the act. But this concept may be of the utmost generality, provided only it possess definite content. Hence the laws are applicable from the earliest movement of thought. The concept must have at least an attribute, or be an attribute or sum of attributes. Hence they are utterly inapplicable to what is called *pure being* or *pure thought*—the alleged starting-point of the immanent dialectic or constructive process of the Hegelian logic. This, as qualityless, cannot come under either the law of Identity or Non-Contradiction, and it can thus yield no possibility of movement or construction. The wholly indefinite is above logical law, and above intelligibility. It can yield a basis neither for analytic nor for synthetic thought.

(2) They are applicable in the case of mere verbal formulae

only hypothetically, but strictly and essentially to whatever may at any time be comprised in the formula. Thus we cannot strictly say that an infinite non-commencement of being in time is contradictory of an absolute commencement of being in time; but we can say that if we could actually think what either set of words implies, there would be two contradictories. We can know what would be contradictory from the form of expression, even though that form is not capable of being translated into an actual or definite object of thought.

§ 141. A concept being an itself or self—that is, possessing definite attributes—it must be thought as such, if thought at all. In other words, the concept and the sum of characters which make it up are identical; and the concept as a whole is convertible with the sum of characters as its parts. In this is manifested the force of the law of Identity (*principium Identitatis*). It implies that a concept in thought is what it is in thought, and not its opposite—contradictory or contrary. *Every object of thought is conceived as itself—or every A is A—or, as Baumgarten puts it, following Aquinas, every subject is predicate of itself.* This is the principle at the root of logical affirmation or position.¹ It is at least that without which affirmation would be impossible.

(a) The earliest expression of the Law of Identity seems to be due to Parmenides,—*χρητὸν λέγειν περὶ τοῦ ἐν ἑμμέναι*,—it behoves us to say and to think this, *that which is, is.*—(Cf. Ueberweg, *Logic*, p. 232.) This is found in the fragments of Parmenides, edited by Mullach. But the first writer who grasped it in its full significance, and stated it for modern thought, was Antonius Andreas, a scholar of Scotus, about the end of the thirteenth century. He died in 1320. In his work, *Quaestiones super XII. Libros Metaphysicarum—Venetiis, 1481*, he makes the Law of Identity not only co-ordinate with that of Contradiction, but accords to the Law of Identity the first place. His formula is *Ens est Ens.*—(See edition of 1513, *Quaest.* v. p. 21 a, and Hamilton, *Logic*, L. v.)

(b) Plato held in regard to sensible things that, as they are in constant change, each thing unites opposites, or contradictions. They do not exist,—they are in a state of flow between being and non-being. We cannot say that the sensible thing is what it is, or that it is not. He held, however, that the axiom of Non-Contradiction applies to Ideas, and to mathematical conceptions,—these being unchangeable. But he did not properly distinguish between Contrary and Contradictory Opposition.—(Cf. the references in Ueberweg, *Logic*, p. 249.)

¹ Cf. Hamilton, *Logic*, L. v.

(c) Aristotle recognised the validity of the principle of Identity in such expressions as "to say that being is not or that not being is, is false; to say that being is and not being is not, is true."—(*Met.*, iv. 7, ix. 10.)

(d) Aquinas says that those propositions are the most known by themselves in which the same is predicated of itself, as *man is man*, or whose predicates are included in the definition of the subject, as *man is animal*.—(*Contra Gentiles*, i. 10. Quoted by Hamilton, *Logic*, vol. iv. *Appendix on Laws of Thought*.)

(e) Baumgarten expressly distinguished the laws of Identity and Contradiction, and called the former "*principium positionis sive identitatis*." His formula is: Every possible A is A, or whatever is, that is, or every subject is predicate of itself.—(*Met.*, § 11; cf. Hamilton, *Logic*, L. v.)

(f) Hegel remarks regarding Identity stated as A is A, that no one thinks or speaks according to it.—(*Log.* i. 2; 32 ff.; *Encycl.*, § 115.) The truth is that no one can accurately think otherwise than in accordance with it, whether he make this explicit or not. When we reason, we do not need to syllogise, though our reasoning is an implicit syllogism. No more do we need to speak in the formula, or in words precisely corresponding to it, however rigidly we may assume it. It would certainly be idle and somewhat ridiculous to say *a planet is a planet, magnetism is magnetism, a spirit is a spirit*; but such a statement is not false, and it may be necessary to identify a concept with its essential characters, when it is alleged, as by Hegel, that it is other than it is, or that it is itself and is also other than it is. If a man says *yes is no*, one is obliged to formulate the denial by saying *yes is yes*, and *no is no*; or if he says *good is evil*, and *evil good*, we are constrained to say *no—good is good*, and *evil is evil*.

§ 142. The Law of Identity implies affirmation and negation—position and exclusion—identity and difference. This correlation arises from the limitation implied in the constituent attributes or qualities of a concept. This constitution or self-hood of the concept is the ground in thought of the negation, difference, not-selfness. The latter is impossible apart from the former, is conditioned by it, has no meaning apart from the positive concept as a sum of attributes.

This negative side may be expressed in the formula—*A which is not B, is not-B*. A concept cannot remain identical with itself, unless in so far as it remains different from what is not itself. The negation is not necessarily a positive concept, or itself an attribute or sum of attributes. It may be, and generally is a purely ideal negation, or the conception of the absence or abstraction of given attributes, *e.g.*, *Being* and *non-Being*, *One* and *None*, either generally or of a given

class, *Centaur* and *no-Centaur*. *Being* or *Thing* is the most general concept we have. *Non-being* is a mere relative, supposing being, but is the sublation wholly of *being*. There can be no reality or really existing object in negative relation to being.

(a) Ueberweg adds the axiom of Consistency (*principium convenientie*), as allied to that of Identity. It is expressed,—*A which is B, is B*, or every attribute which belongs to the notion may serve as a predicate to the same. The formula,—*Not-A is not-A*, is merely an application of the axiom of Identity to a negative notion. So *A which is not-B, is not-B*, is only an application of the principle of Consistency; and is the ground of negation.

There seems to me to be no necessity for adding this so-called axiom of Consistency. Everything it can do for us is embraced in the scope of the Law of Identity. When we say *A which is B is B*, we merely apply the Law of Identity, after analysis or definition of *A*,—*A being B is B*. Again, *A which is not-B, is not-B*, is the negative side of the Law of Identity, for *A* being given as not-*B*, or lying out of *B*, is merely *A* lying out of *B*, or *A* (a definite concept) being given as different from what is not-itself (*B*) is simply held different from what is not-itself (*B*). We cannot affirm the Law of Identity on its positive side without implying its negative application. A thing or concept cannot remain identical with itself, unless in so far as it remains different from what is not-itself.

§ 143. The Law of Identity, in saying that a concept is itself and nothing else—that *A is A, and not not-A*—shows, as we have seen, a negative side, a negation or denial. While it affirms the identity or convertibility of the concept with itself, it denies the identity of the opposite (contradictory) of the concept with itself. This implies that a concept cannot be conceived as itself, and also as its contradictory opposite in the same act of thought. *A* cannot be conceived as *A* and *not-A* in the same act or in one act of thought, or even in two succeeding acts of thought—that is, at all. This is the Law of Non-Contradiction. The violation of it, if that were possible to thought, would be the nullity of thought itself. *A* and *not-A* cannot be both thought of the same concept. *Circle* and *Square* cannot be both conceived of the same figure, or conjoined in one act of thought. *A* conceived as equivalent to *not-A* is conceived as equivalent to nothing or zero.

The principle of Non-Contradiction has been expressed—
“Judgments opposed contradictorily to each other, as, *A* is

B, A is not B,—cannot both be true. The one or the other must be false. From the truth of the one follows the falsehood of the other. The double answer, Yes and No, to one and the same question, in the same sense, is inadmissible.”¹

§ 144. The law of Non-Contradiction is inaccurately expressed in the formula—*It is impossible for the same thing to be and not to be.* This refers, not to the concept as a concept, or object of our thought, but to an individual or real object in time, or in time and space. Existence in time and non-existence in time are not incompatible unless they be predicated of the same individual at one and the same time. The individual may pass in succession from existence to non-existence, or from infancy to maturity, or from black to grey. But this in no way affects the scope of the law of Non-Contradiction; for these opposite predicates or concepts of the same individual can still not be conceived as belonging to the individual in one and the same act of thought. He cannot be conceived as existent and non-existent, in one—that is, in a consistent thought. The element of time as a varying condition of existence and thought has no effect whatever on the fundamental consistency or inconsistency of attributes conceived. Affirmation and negation of contradictory attributes are quite possible, in successive times, of a persistent or enduring object, but they are not consistent or possible of the same subject in the same act of thought. The law of Non-Contradiction is, therefore, of universal applicability in all definite thought. The only time which Logic knows is the present, and that not as the time of an actual event, but as the time merely of an ideal conception. Properly speaking, the *is* of the proposition has no reference to actual time; but to consistency of concept with concept.

(α) “Judgments opposed contradictorily cannot be true at the same time.” But this is inexact. (1) If “at the same time” refers to the judgments as acts of thought, it says too little. This would not help us to avoid contradiction, for two judgments might be as to matter contradictory, if thought at different times—e.g., *The Iliad is the production of one man; The Iliad is the production of several authors.* The one might be said in the 17th century, the other in the 18th; yet they are contradictory judgments. (2) “At the same time” really refers to the contents of the judgments, and means that judgments contradictorily opposed cannot be true together, or cannot both be true.

¹ Ueberweg, *Logic*, p. 235.

But in this reference the expression is inexact.—(Ueberweg, *Logic*, pp. 236, 237.)

To speak of *the same time* in connection with the law of Non-Contradiction is unduly or accidentally to limit it. Two conceptions which are contradictory are essentially together in time—i.e., in the indivisible act of thought which comprehends them. The effort of thought is to hold them together at the same moment, while it finds it impossible to unite them in one subject.

§ 145. The law of Non-Contradiction regulates—(1) the concept as such; (2) the concept in relation to an attribute (*contradictio in adjecto*); (3) mediate contradiction in corollaries.¹

Of two contradictory judgments, we know that both cannot be true; but we do not thus necessarily know which is true, and which false. The principle does not enable us to ascertain this; but only that having found somehow that one is true, we are certain that the other is false. Is this man, after trial, proved guilty or not? He is proved guilty, therefore it is false that he is proved not guilty. He is proved not guilty; therefore it is false that he is proved guilty. Until, however, we have to do with a definite judgment in time, we cannot go beyond the merely formal position of saying that both cannot be true.

(a) Aristotle has expressed the law in various formulæ. Thus: "A thing cannot at once be and not be in one and the same subject and under the same relation."—(*Met.*, iii. 3. τὸ γὰρ αὐτὸ ἓνα ὑπάρχειν τε καὶ μὴ ὑπάρχειν ἀδύνατον τῷ αὐτῷ καὶ κατὰ τὸ αὐτό.) Again: "The same thing cannot at the same time be and not be." Again: "Affirmation and negation cannot be true at the same time of the same subject."—(*Met.*, iii. 2.) "The same subject does not admit at the same time of two contrary attributes."—(*Cf. Met. Pr.*, ii. 2.) This, according to Aristotle, is the most certain of all principles.—(*Met.*, iii. 3.) It is indemonstrable, but the absurdity of its denial can be shown.

Aristotle holds that the principle of contradiction applies to sensible things, or to the changeable. The same object cannot in actuality or fact (*ἐντελέχεια*) contain opposites; though it may be capable (*δύναμις*) of passing into or through opposites—properly contraries.—(*Met.*, iv. 5.)

"Non-existence is neither in the image nor in the object, but simply does not exist. The notion of non-existence, however, is primarily in the negative judgment in which we think the discrepancy between image and actuality. It can always be used to denote what does not exist, but is falsely conceived to exist; never to denote what does exist. In other words—it is not true that the same thing which is, also is not; or, as Aristotle says,—it is impossible that the same thing is and is not."—(Ueberweg, *Logic*, p. 253.)

¹ Ueberweg, *Logic*, p. 236.

§ 146. The condition of Non-Contradiction is complete identity in sense, both in the single terms of the judgment, and in their affirmation and negation. When the sense of the terms is indefinite, or vacillating, *yes* and *no* may be answered to the (apparently) same question.¹ Think exactly, and state precisely is the rule of contradictories.

Affirmation and negation differ according as we consider the concepts as absolute, or phenomenal merely of what transcends them. What, for example, appears to sense may be affirmed as a sensible fact, and denied as a transcendental or supersensible fact. We may say what I perceive is, what I perceive is not, in the sense that it is merely the manifestation of something beyond itself as cause. These are quite different senses, and they are only conflicting when confused and regarded as one. The law of Non-Contradiction is, moreover, in no way affected; it is still strictly and properly absolute in respect of the sensible phenomenon; for this, as an object of perception or knowledge, is as it is—as it exists at a given time—and cannot be identified with aught else, either in the given time or in any other. What relations it may have to the transcendental is a wholly separate point, and can in no way be regulated by the law of Non-Contradiction. At the same time, the assertion of the absolute or real identity of the differences of experience is fatal to the possibility of any truth whatever. Vacillation in regard to the sphere of the affirmation and negation is at the root of most of the current Hegelian fallacies. Their apparent profundity is only lack of transparency.

(a) "Motion and change have reality (*i.e.*, independently of human comprehension); and judgments opposed to each other contradictorily cannot both be true."—(Ueberweg, *Logic*, p. 240.)

The change which the judgment represents takes place in a given or definite time. The conception of the event refers to what takes place in the time and the points of time—*e.g.*, the assassination of Caesar belongs to a definite section of time, and is a continuous happening in that time. Our judgment of it is true in as far as it reflects the continuity of the occurrence in conformity with its actual occurrence during the given time, and as a happening in the historical order of time—before and after.

"Historical judgments affirming and denying the same about an occurrence in time—*e.g.*, Socrates was born 469 B.C., and Socrates was not born 469 B.C., but 470 or 471, are as strictly opposed to each

¹ Cf. Ueberweg, *Logic*, p. 237.

other as contradictories, and can as little be both true as the mathematical judgments which refer to unchangeable existence,—the sum of the angles of any rectilineal triangle is, and is not, equal to two right angles. Hegel and Herbart assert that motion and change are in themselves contradictory, and Hegel teaches that motion is the existing contradiction: Every moment of passing over from the one circumstance into the other (*e.g.*, the beginning of day), unites in itself predicates which are opposed as contradictories to each other. Hegel asserts that these contradictory judgments are both true in reference to the same moment; but Herbart thinks that that is impossible according to the irrefragable law of Contradiction, and that the passing over into and becoming-another have no reality. Both opinions are false. The semblance of contradiction results from the indefiniteness of the sense, and disappears as soon as every individual expression is referred to distinct notions. By means of strict definition of notions, secure points of limitation are at once reached. . . . The axiom of contradiction may be applied to the notion of motion, if we do not confine our attention to the proposition which is without difficulty—*Motion is motion*; but analyse the notion, and go back to the elements which are fused together in it, as Trendelenburg himself has done, that “motion (why not rather that which moves itself?) is and is not at the same point at the same time.” According to our previous explanations, this being and not being at the same point at the same time is a mere fiction. Motion is not impossible, because it is not contradictory.”—(Ueberwäg, *Logic*, pp. 241, 242, 244. See there the whole able criticism.)

(b) Wolf's formula is: “Si A est A, fieri non potest, ut simul A non sit A.”—(*Logica*, §§ 271, 529.) “Propositiones, quibus idem negatur esse diversum a se ipso, sunt axiomata. . . . Fieri non potest, ut idem prædicatum eidem subjecto sub eadem determinatione una conveniat et non conveniat, immo repugnet.”

(c) Kant expresses the law of Non-Contradiction by “A predicate does not belong to a subject which contradicts it.”—(*Kritik*, p. 190 ff., cf. p. 83 ff.) Its violation abolishes all knowledge, though it is no test of the (positive) truth of a synthetic judgment.

(d) One of Hegel's objections to the law of Non-Contradiction is that the form of the proposition contradicts it, for a proposition promises a distinction between subject and predicate, and this is not fulfilled by the law. As the form of the proposition lies in the copula, or element of predication, it is not true that it promises anything of the sort. It only promises what it does—that is, to unfold the subject by being more explicit analytically, or to add to it synthetically.

We may have a very valuable addition to our knowledge in the matter of clearness or explicitness in analytical propositions where no distinction is added, and we may have an equally important accession in the case of synthetic judgments. But the form of the proposition really makes no promise; only if it did, the law of Non-Contradiction is equally necessary in either case, and essentially regulative. This, like the other criticisms of the law by Hegel, is of the most superficial order.

The view of Hegel is thus well and summarily put by Ueberwäg:—

"Hegel holds that the law of Non-Contradiction is invalidated by what he calls the axioms or laws of Difference, Opposition, and Excluded Middle, and that the truth of these laws lies in the unity of identity and difference, expressed in the category of the Reason. Thought as *Understanding* lets things stand in their strict determinateness and distinctness from each other; then there comes the self-elevation of those finite determinations and their passing over into their opposites, wherein lies their dialectic or negative intellectual moment. Then, finally, there is the unity of the determinations in their opposition—the speculative, or positively intellectual moment,—in which the dualism of the understanding and the negative monism of the reason become the mutually dependent elements of free speculative truth."—(Ueberweg, *Logic*, pp. 257, 258.)

It is only necessary meanwhile to remark on this (1) that truth, as the unity of identity and difference, so far as simple contradiction is concerned, is an impossibility to thought.

(2) That such a formula is utterly inapplicable to the conception of any occurrence in time or historical fact.

(3) That it is inapplicable to the conception of every mathematical property of extension,—to all the truths of pure geometry.

(4) That it is subversive of all moral distinctions.

(5) That it confounds the unity of identity with the unity of correlation, which asserts and supposes difference in the terms correlated, and preserves the difference.

(6) The formula is not applicable even in contrary opposition, where we deal with a plurality of opposites of the same class.

(7) Such a formula is not applicable in any sphere of thought—call it Reason or anything else. If it held good in the transcendental sphere, or in any one sphere open to our intelligence, while in the other, or finite sphere, the law of Non-Contradiction were valid, then we should have an absolutely irredeemable contradiction in intelligence as possible to man. There would be no means of deciding which of the two orders of (so-called) truth we should follow. The results would be scepticism in thought, and chaos in reality.

Identity and Difference, as generic concepts or ideas, cannot be thought apart from each other; individual existences are identical with themselves, and different from others, just because they are individual; and each being what it is, can be, and be thought, apart from any other, definite, individual. No other individual is necessary to the existence of any one individual, as the concept of difference in general is necessary to the concept of identity in general.

(e) There is one special point in Aristotle's doctrine of Substance which is well deserving of attention, and which bears in a marked manner on the theory alike of being and knowing. It is obviously connected with his view that the forms of thought are related to, dependent on, the forms of existence. The sixth and last property which he attributes to Substance is that, while remaining one and identical, it is yet capable of receiving contraries by a simple change which takes place in itself. This property is absolutely special to substance,—the individual,—to it and nothing else,—*omni et soli*. Nothing else is capable of this.

One and the same colour does not admit of contraries. A colour numerically one and the same cannot be at the same time black and white: just as one and the same action cannot be at the same time good and bad. But the individual,—substance proper,—may remain the same and yet in turn be black and white, hot and cold, good and bad. In nature nothing else presents a similar property. Least of all can we maintain that this is true of word or thought.

It may seem indeed that one and the same assertion may be at once true and false. If we say of one seated, that he is seated, this assertion would become false, supposing the person to rise. But there is here only a formal difference. So far as the individual or substance is concerned, this is susceptible of a change, because it undergoes it in itself,—in other words, remains the same amid the change. But so far as word and thought are concerned, these remain absolutely and always immovable, and contraries only exist for them because the object itself,—what is expressed or thought,—changes. The assertion that some one is seated remains not the less always the same; it is only because the object changes that it is sometimes true and sometimes false. Thought is in this respect like the word. Thus then the special property of the individual existent is to be as to form susceptible of change, as undergoing it in itself. But in this sense neither word nor thought can receive contraries. These are susceptible of contraries, not because they themselves receive modification, but because something external to them happens to be modified. It is only because the object is or is not in such a way, that the assertion can thus be said to be true or false; it is not at all because the word itself admits contraries. Word, thought are not subject to change, and if this did not take place in objects themselves, they would in nothing receive contraries.—(*Cat.*, v. p. 4 a, 21.)

This is an eminently sound and valuable doctrine. So far as it bears on the nature of thought, it is thoroughly unassailable. And it cuts at the root of the whole Hegelian assumption of the passage of thought into its opposite, whether contrary or contradictory. Such a passage is not consistent with the very conditions of the existence of a concept to begin with. And, further, as the nature of thought and the nature of the individual object are shown to be so different, in their essential properties, it strikes at the very root of the Hegelian assumption of the identity of thought and being.

§ 147. Given two contradictory opposite concepts, which though not conceivable as one, are yet conceivable separately, a third law emerges. Between these there is no third or middle concept possible to thought. Accordingly, any positive concept or subject of thought whatever must be thought by us as lying either within the one sphere, the A or positive, or the other sphere, the not-A or negative. It cannot be thought as both, but it must be thought as either in the one or the other sphere. And if there were proof that the thing

thought did not lie in the one sphere, say the positive, it must be thought to lie in the other sphere, the negative. But this never implies a necessity of existence of the object thought; it implies only in the actual reality a necessity of inclusion on a hypothesis of existence. This is the law of Excluded Middle between two Contradictories, (*Lex Exclusi Tertii aut Medii inter duo Contradictoria*).

The principle of Excluded Third or Middle between two Contradictories may be thus stated: Judgments opposed contradictorily, as A is B, A is not B, cannot both be false, but one or other must be true, there being no third or middle judgment possible; or "the double answer *yes and no* cannot be given to one and the same question understood in the same sense."

Considerable misconception has arisen regarding the law of Excluded Middle from supposing that it warrants "a universal comparison of any possible subject-notion with any possible predicate-notion," and that the predicate must either inhere or not in the subject. This is irrelevant and puerile. In accordance with the essential nature of logical law, it supposes a definite subject with its definite sphere of at least possible predication.

§ 148. The laws of Identity and Contradiction warrant us in concluding from the truth of one contradictory to the falsehood of the other; add the law of Excluded Middle, and we are warranted in concluding from the falsehood of the one contradictory to the truth of the other. Excluded Middle thus limits the sphere of the thinkable in relation to affirmation. Of the two forms given in the laws of Identity and Contradiction, as exclusively possible, the one or the other must be affirmed as necessary.¹

It is necessary to observe that none of those laws has a categorical reference or import. They are but conditions of our thinking when we actually think, or they are conditions when we hypothetically think. They cannot of themselves inform us of the fact of a real existence or its qualities. This is clear in regard to Identity and Non-Contradiction, in each of which cases a datum is presupposed. And it is not less true of Excluded Middle, where the force of the law is in the event of the one alternative being affirmed on grounds proper

to it, the other may be denied, and any third alternative excluded. And so in the case of negation. Hamilton has been charged with supposing the law of Excluded Middle to affirm one of the contradictory alternatives as necessary. A careful study of his statements shows that this is not the case. We try, for example, to think an absolute beginning; we find we cannot. We try to think infinite non-commencement; we find we cannot. We conclude that in spite of this inability, one or other must be real, on the limitation imposed by the exclusion of the third or middle. There is here no affirmation of the one alternative or the other, but only that the one or other is necessary, and necessary on the ground of the exclusion of the middle according to the pure formula. To determine which is or is not, we must go beyond the logical law. All that Hamilton seeks actually to have proved is that existence transcends positive thinking, or that may be real which we cannot actually represent in thought.

(a) Kant, however, apparently has some view of the sort, inaccurately attributed to Hamilton. For he makes the law of Excluded Middle the basis of *apodictic* judgments. The law, as has been said, is incapable of determining which of the alternatives is to be taken. As Krug puts it, it is only the principle of reciprocal capacity for determination.—(*Denklehre*, § 19, cf. Ueberweg, p. 272.)

(b) Hegel objects to the law of Excluded Middle that it does not distinguish between cases where the denial is proper and where it is not proper. It does not distinguish between partial and total negation. It is, therefore, meaningless.—(*Encycl.*, § 119; Ueberweg, *Logik*, p. 261.) Thus it does not tell us that such predicates as *green* and *not-green*, *wooden* and *not-wooden* are not applicable to *Spirit*. To this the obvious answer is, that this law, like the others, supposes a definite concept, or, as it has been put, a suitable question, and regulates our thought concerning it. The law does not prescribe playing with predicates, but assumes that people are reasonable beings and in earnest in their inquiry. By parity of reasoning, abuse all spectacles, because you have never learned to read.

Hegel varies in his statement of the law of Excluded Middle, at one time confounding it with that of Non-Contradiction; at another time stating it precisely enough under the name of the axiom of the Opposite, or of Opposition, or Excluded Third.—(*Logik*, i. 2, p. 67.) His chief criticism of it consists in saying "that there is always a third between $+A$ and $-A$, viz. A in its absolute value; and O is a third between $+$ and $-$. But this is to identify the logical and mathematical relations which are essentially distinct. Contrary not Contradictory Opposition exists between positive and negative size in the mathematical sense. The negative quantity $-A$ is by no means identical with the logical denial of $+A$. A quantity need not be

either $= +A$, or $= -A$. It may be either $= +A$, or not $= +A$, and also either $= -A$ or not $= -A$. And looked at apart from the signs, according to its absolute value, it may be either $= A$ or not $= A$.—(Ueberweg, *Logic*, p. 273, cf. Ott., *Hegel*, p. 197-204. For a fuller discussion of this and other cognate points see below, chapter xiv.)

(c) Again, it is objected that the mean between the contradicting predicates is often the true predicate. Between "guilty" and "not guilty" there is "not proven." Between "full imputation" and "no imputation" there is "partial imputation." If the knowledge of truth is not comprehended in a development, says Erdmann in Hegel's sense, everything is either wholly truth or wholly not-truth. Truth becoming or developing itself is both or neither the one nor the other."—(Ueberweg, *Logic*, p. 264.) To this Ueberweg virtually replies: These statements, even if true, prove nothing against the validity of the axiom of Excluded Middle, rightly understood. They can only be held to be exceptions to it by exchanging contradictory for contrary opposition. This is unwarrantable. The law is not properly expressed in the formula—A notion, or its opposite, is to be predicated of every object. The opposing members of contradictory opposition denote only the presence or absence of a strict agreement of the combination of conceptions with the actual existence they represent. This is what is asserted universally by the axiom of Excluded Middle. The negation cannot be interchangeable with the affirmation of the predicate opposed as a contrary. *Not guilty* is not equivalent to *guiltless* or *pure*. *Not mortal* is not equivalent to *immortal* or *eternal*. *Not good* is not equivalent to *bad* or *wicked*. . . . The contradictory disjunction—*guilty* or *not guilty*,—is not to be charged with the error of denying the possibility of half-guilt or partial insanity. The error lies in making reciprocal the negation of this definite guilt with the affirmation of perfect innocence. Forms of transition between different kinds of the same genus are a mean between existences positively distinct. They do not stand to each other in the relation of Being and non-Being, but in that of Beings so and otherwise. Such transitions are not excluded by the law of Excluded Third between the affirmation and negation of the same.—(See Ueberweg, *Logic*, p. 264 *et seq.*, and the valuable remarks which follow.) It comes very much to this, that where you have a definite concept or subject, and the question is—*is this or that definite attribute to be predicated of it?* the answer must be definitely *yes* or *no*. If the attribute is indefinite,—or variable say as to degree or quantity,—the how much cannot always be definitely given or predicated. *Is this man sane?* What amount of aberration constitutes *insanity*? This must be first decided. In many cases the question, as put, is definite, but the answer is made on the principle of a cross-division—*e.g.*, *Is this man guilty or not guilty?* The answer of the jury may be—*It is not proven*. This is to mix up two wholly different points of view. This does not exclude the man's guilt, nor does it include it. It is, therefore, not a proper answer to the question. But the first question itself is not the proper question to put to the jury, but really whether the crime alleged is *proven* or *not proven*. *Guilty* or *not guilty*, so far as the law is concerned, means *proven* or *not proven*. The man

is assumed to be innocent until he is *proved* guilty. The questions of *fact*, and of *proof* of the fact are quite different; and ought not to be mixed together. The law should in expression limit itself to what it actually is limited,—the question of proof.

(d) Plato allowed a third or middle between Being and Nothing—in sensible things. The Ideas have being—are,—Matter is not; sensible things as changing neither are, nor are not. They are the flow in Matter. Aristotle allowed no third between Being and Nothing.—(*Met.*, iv. § 1, §§ 5, 6, § 9; cf. Ueberweg, p. 271.)

§ 149. The logical laws are fundamental—not derivable from any other laws, say of Intuition or Experience. They are the inseparable concomitants even of all Intuition.

(a) It has been said that the logical law of Identity is derived as a generalisation from the intuition of Identity in things or in experience. The latter alone is fundamental. To consider this we must distinguish metaphysical or real, and logical or notional identity. The former means oneness of the individual at different times; the latter means, subjectively, similarity or sameness of the mental impression at different times, or, objectively, community of attribute among otherwise different objects existing at the same or different times. In the former case there is convertibility through unity; in the latter, through similarity. Now it is impossible that logical identity can be derived as a generalisation from metaphysical identity. For oneness at different times implies already the logical law in its utmost universality. To be perceived as one implies as a concomitant to be known as one out of many—as in a given time, as this not that;—it implies in fact the concepts of unity, identity, difference, applied in a special instance, for all intuition is of the concrete or special. The intuition of the quality or fact in time with the application to it by the mind of the universal concept makes up the apprehension of reality—that is, the metaphysical act. But neither is intuition prior to concept, nor concept to intuition. They are but the inseparable complementary sides of one and the same act; the one, therefore, cannot, properly speaking, generate the other.

(b) It has been said that the logical law of Non-Contradiction is a generalised application of the intuition of difference to any concept whatever. A thing or concept is not another; it is not any one of the things or concepts from which it differs. Again, Excluded Middle,—Every B is either A or Not-A, is said to be the intuition of Difference and Identity generalised. When A is distinguished from Not-A, it is discerned by reflection that these divide the extent of all conceivable existences into two classes.

To this, the answer is, that in the case of Contraries, where there are two positive qualities or presentations—say colours, as *black* and *red*, *green* and *blue*,—there is an intuition of diversity, and the one is distinguished from the other through the intuition. Still even here the distinction would not be possible, unless identity involving diversity were an original scheme or form of thought. To say that *black* is not *white* is to say that *black* remains itself, and does not pass into or be-

come one with *white*,—that there is diversity. But diversity cannot be said to be generalised from the intuitional act, as Porter says; it is rather so related to this act that the latter is not possible without it. It is not when a quality is distinguished from its opposite that we generalise the laws of Identity and Difference, so as to create them; but it is because these laws are already implicitly in our possession that intuition is enabled to make the distinction, or that the intuition becomes possible. Reflection may unfold to us their full extent,—their universality,—but it does not make them to be, or make them universal, as ordinary logical thought does in regard to the generalisations of concepts or scientific laws.

(c) Can the law of Non-Contradiction be proved? Or is it ultimate? Indirectly, it is shown to be necessary, seeing that no thinking can be carried on without assuming and using it. Let *Yes* be also *No*, and *No* also *Yes*, and there is no one definite conclusion possible, whether immediate or mediate, as in reasoning. Ueberweg, however, attempts a direct proof of it,—in substance as follows:—

The highest logical principle is, in his view, “the idea of truth—that is, the consistency of the content of perception and thinking with existence.” And it is only in so far as the principle of Non-Contradiction has a fundamental significance for a series of other propositions that it is itself fundamental, while it is derivable from those propositions. But it may be said that to deduce it from other propositions can be done only on the supposition that the contradictory cannot be true. To this it is replied, that the thinking which deduces all logical laws rests on them. These laws carry with them their own validity, and are present in our actual thinking, even in that which deduces them, yet this deduction does not rest upon a scientific knowledge of those laws, and this is to be carefully distinguished from their actual validity.—(*Logic*, p. 239.)

This, I submit, is not a proof of the law; it is not even a derivation or deduction of the law. It is true that all logical thinking is conformed to the law; that the law is exemplified in every concept, judgment, and reasoning. It is further true that we come to know the law as manifest or given in individual cases,—this or that concept, judgment, or reasoning. But as thus itself regulating, conditioning every possible ground of its proof through a notion or proposition beyond itself, if that were possible, it is therefore not provable or derivable. Nor is it a generalisation. It is essential in each act of thought; as such, it is necessary; as necessary, universal. We know and feel its force in individual instances of thinking; we reflect on these, realise its essentiality, its necessity in each case, its universality, therefore, in all. This is scientific knowledge of it, but it is not a deduction; it is an analysis of the matter of our thinking and the reflective recognition of its ever-present condition. It is in fact coming to know, through analytic reflection, what our thinking really means. This for us, in such a sphere of inquiry, is the highest, best, and only method. We cannot offer direct proof in such a case; we can only show that those who deny it, consciously or unconsciously palter with words.

(d) An attempt has been made by Boole and others to derive the

logical laws, especially Non-Contradiction, from mathematical relations, but unsuccessfully. There is no mathematical relation, however far run back, which does not presuppose those laws, and is embraced by them. They are the primary conditions of the ultimate mathematical conceptions, as of all other definite conceptions.

§ 150. It seems necessary to admit another law of thinking which, if not co-ordinate with the three laws already mentioned, is yet auxiliary and important, as connecting pure and actual thought. The Principle of the Sufficient or Determining Reason, or Reason and Consequent, refers to the deduction of cognitions, especially judgments. "Infer nothing without a ground or reason." The cognition which necessitates the inference is the *logical reason, ground, or antecedent*; that necessitated is the *logical consequent*; the relation between the reason and the consequent is the *logical connection or consequence*.¹

(a) Leibnitz was the first to make the principle of Sufficient Reason, as a law of inference co-ordinate with that of Non-Contradiction.—(*Theod.*, i. § 44.) His expression of it is "that nothing can be inferred unless it has a determining cause, or at least reason." It refers to why "a thing exists, an event happens, a truth has place"—(*Lettres à Clarke*, v.)—that is, it is both metaphysical and logical. While the principle of Contradiction is, with Leibnitz, the ground of necessary truth, the Sufficient Reason is the ground of contingent truth.—(For references and quotations regarding these laws, see Hamilton, *Logic*, L. v., and relative Appendix; also Bachmann, Krug, and Ueberweg.)

(b) Ueberweg states the axiom of Sufficient Reason thus: "A judgment can be derived from another judgment (materially different from it), and find in it its sufficient reason only when the (logical) connection of thoughts corresponds to a (real) causal connection."—(*Logic*, p. 281.) He adds: "The logical form of axiom only asserts that the combination of judgments, by which a new one is derived from given ones, must rest on an objective causal nexus. Whether and in what sense everything objective stands in causal relations is to be decided elsewhere (in Metaphysics and Psychology)."—(P. 282.)

§ 151. Pure logic as a science is, in the view of some, the application of the three formal laws to Conception, Judgment, and Reasoning. Hamilton at first in the *Lectures*, and also originally in the *Discussions* (p. 160), admitted a fourth co-ordinate law of thought,—that of Reason and Consequent. But he finally held that this as a logical relation was nothing more than a corollary from the law of Non-Contradiction in its

¹ Cf. Hamilton, *Logic*, p. 84, and the references there to Schulze and Krug.

three phases,—that is, the three principles already specified. In an analytical judgment the predicate is obviously affirmed on the strength of formal law,—Identity. Here there is a mere logical discrimination of subject and predicate, or of reason and consequent. In all immediate inferences from a simple proposition this also is true; and in all strictly syllogistic inference, which only evolves the contained and necessitated. “The principle of Sufficient Reason,” says Hamilton, “should be excluded from Logic. For, inasmuch as this principle is not material (material = non-formal), it is only a derivation of the three formal laws; and inasmuch as it is material, it coincides with the principle of Causality, and is extra-logical.”¹ This may be correct. But obviously the principle of the Sufficient Reason, or rather of Condition and Conditioned, is a valuable, even indispensable one in all our practical and scientific thinking. The formal laws regulate well enough analytical judgments. They enable us to affirm in the predicate what was in the subject. In synthetical judgments, they preclude us affirming an attribute contradictory of the subject or its attributes. But we require, at least for practical purposes, to be cautioned against arbitrary synthetical judgments. We ought to seek and to have a ground or reason why we attach the new predicate. Think not only non-contradictorily, but think with reason. This caution is, in a very strict sense, extra-logical, but it is very material, and its application would stop a good deal of loose talk, especially in philosophy.

When a proposition is challenged, when in fact the right or propriety of adding a new predicate to a subject is questioned, to reply that “thought is synthetical,”—is as naked a begging of the question as can well be conceived. What I ask for is a ground or reason of the addition or synthesis; what I get in reply is, there is an addition. Why do you do this? I do it. This is an absolute confession of mere arbitrariness, and violates the acknowledged principle,—think nothing without a (sufficient) reason or ground. From the universality of this principle there is no escape, unless in the limited circle of self-evident, self-guaranteeing principles. And these, in some form or other, are a necessity of every philosophy.

¹ *Discussions*, p. 603.

§ 152. The relation of Reason and Consequent is not identical with that of Cause and Effect. Every cause known in relation to its effect is a reason, and every effect known in relation to its cause is a consequent. But every reason is not a cause, and every effect is not a consequent. Cause is a reason of a thing being; Reason is a cause of a thing being thought or known: the one is the *ratio essendi*; the other is the *ratio cognoscendi*. *E.g.*, the tree being some inches taller than when I last saw it is the reason why I believe it has grown; but the known increase of height is not the cause of its growth. This is the *ratio cognoscendi*. The cause or causes of the increase in the height of the tree are to be sought in soil, moisture, heat, life. These form the *ratio essendi*. If these were known to me, and known also to have had the effect of increase of height in the past, these would form a *ratio cognoscendi*, or ground of anticipating the growth on the principle of uniformity and of that alone. They would be in the relation of Reason and (anticipated) Consequent; but nevertheless this is a wholly different relation from that of Cause and Effect. Cause and Effect may pass into Reason and Consequent; but Reason and Consequent is not necessarily Cause and Effect.

(a) Ueberweg's statement of the principle (p. 281) is obviously too narrow. Every cause may be a reason; but every reason is not necessarily a cause, unless in a very unusual sense of the term. In the case, for example, of conversion and other forms of immediate inference, it would be inaccurate to call the convertend or datum the cause of the converse, though it is the ground and the necessary ground. It may be doubted also whether in any case the inference is made on the ground of the antecedent being cause merely. The logical laws will be found to afford the nexus,—the cause becomes in fact a reason. The difference between cause and reason logically is that the complete knowledge of the cause *per se* could not lead us to anticipate or predict, far less necessarily deduce, the effect, while the full knowledge or consciousness of the reason not only enables, but necessitates us to anticipate and think the consequent. Thus, no mere knowledge of motion in any of its forms could enable us apart from experience to anticipate or predict light or heat, or even thus know what either of these means. The proposition in immediate inference, the premisses in a reasoning, lead and necessitate us *per se* to the consequent or conclusion.

§ 153. The laws of thought as the necessary, though undeveloped, principles of all Conception, Judgment, and Reasoning, are assumed and proceeded upon in every act of thought.

Ordinary thought does not find it necessary to state them or to set them out in their abstract form; and when reflection does so, they may appear as too simple for explicit statement. By some the abstract formula has been derided as "puerile."¹ "Puerile" they are not in any proper sense, for they are known as general principles only to mature reflection. Simple they are and self-evident as all necessary and universal principles are, and the more simple the greater the universality, and the higher the abstraction. Every axiomatic truth is simple, but it is not therefore puerile or unimportant. $1 + 1 = 2$ is the basis of arithmetic. This is simple, but absolutely essential and valuable as to results. 'The laws of Logic are indeed in themselves more simple; that is, less charged with attributes than the laws of any other, even abstract science, such as geometry: of all laws they have the widest extension. Geometrical and physical laws in their greatest generality imply or presuppose the logical laws. Their value and importance are not manifest from the mere statement of them, but from their regulative influence over the whole of human thinking. And their importance is especially manifested as a criticism of, and check upon, aberrations from normal human thinking—really verbalism—as is manifested in the basis and method of the so-called Logic of Hegel.

§ 154. Affirmation and negation are implicit in the concept, but still truly operative. The reference of a given object to a class, the recognition of the similarity or identity of its attribute with the class-attribute, is an affirmation, and proceeds on the assumption of the law of Identity—that similars are thinkable as one or the same. It proceeds further on negation—that is, on the assumption provided for by the law of Non-Contradiction that an attribute is to be discriminated from non-resembling or differing attributes—is to be excluded from the contradictory sphere. There is implied further that this affirmation and negation are the only possible alternatives, and that if of a given attribute, we affirm similarity to the class-attribute, we negate difference; and if we negate difference we affirm similarity. This supposes the law of Excluded Middle or Third. These three laws or axioms, accordingly, while they may be considered apart for scientific purposes or statement, are not separable in application. We cannot, in

¹ Vera and Hegelians generally.

a word, state one of them without implying all the others.¹ As essential to each other, they are essential to every act of thought.

§ 155. The laws of Identity, Non-Contradiction, Excluded Middle, primarily regulate thought in its explication, or thought considered analytically. A concept regarded analytically is the subject of a judgment, in whose predicate is explicitly evolved or stated in terms, an attribute implicitly contained in the subject. For example, we say *Body is extended*. *Extension* is already in the concept of *body*, and the judgment which states it explicitly is analytic or explicative. A concept regarded synthetically is the subject of a judgment in whose predicate is explicitly evolved, or stated in terms, an attribute not contained in the subject. This judgment is synthetic or ampliative. For example, *Body is heavy*. The attribute *weight* is an addition to the notion of *body*. *What appears to begin to be has a cause*. *Cause* is added on to *apparent commencement*. *The air is elastic*.

It is clear that the laws of Identity, Non-Contradiction, and Excluded Middle regulate analytic thought, for this says no more than that a concept, as a sum of attributes, is identical in part or whole with its attribute or attributes. The reason why we state the predicate and refer it to the concept is to be found ultimately in the principle of the Identity of the whole and its parts,—a form or application of the Law of Identity. The other laws are needed as guarding or conserving the application of this principle. These laws not less regulate synthetic thought, but they do not afford the reason of it. A predicate added to a subject cannot be contradictory of that subject. We cannot form a synthetic proposition by means of *A* and *not-A*—*Organised* and *Non-Organised*. Every synthetic predicate while not evolved by means of the law of Identity, must, nevertheless, conform to the law of Non-Contradiction. Negatively, therefore, the formal laws regulate synthetic judgments of all kinds, whether experiential or *a priori*.

§ 156. But if the reason of the addition of the new predicate be not in the formal law, wherein, it may be asked, does it lie? This question is extra-logical. Properly speaking, Logic cannot tell us where the reason lies for adding a given

¹ Compare Hamilton, *Logic*, iv., *Appendix*, iv.

predicate, and whence it is drawn. This is for experience and Psychology to determine, alike in regard to the matter of Perception or Intuition, and in regard to what are called synthetic *a priori* intuitions and judgments. But Logic as the formal science of thinking is concerned with it to this extent, that the addition of the predicate be not made wholly arbitrarily or without a reason of some sort. It thus provides a form for this mode of judgment as it does for analytic judgment,—a form of strict and necessary law.

§ 157. Thinking, therefore, which in the synthetic form added arbitrarily or without some reason a predicate to a subject, would be not thinking, properly speaking. It would as arbitrary have no analogy with the highest or strict type of thought given in analytic thinking. The mind conscious of thinking is, therefore, compelled to say to itself—*Affirm nothing, where an alternative is possible, without a ground or reason.* This principle leaves of course out of view the question as to what sort of a reason entitles us to affirm a particular predicate or consequent. That must be determined by intuition and experience, and may be wholly contingent. The principle is satisfied if a reason be set forth, and if it can be consistently joined with the consequent or predicate; and if it be merely supposed true as a matter of fact. Thereupon it will regulate the inference,—the necessary inference or relations between the subject or predicate,—or between the reason and consequent. In a word, what Logic professes to perform here is, as usual, merely a hypothetical function: given a reason, or a reason being supposed, here are the laws which regulate its connection with its consequent. The influence of this principle is seen in Hypothetical Propositions and Reasonings. Logicians have given special applications, of it in the formulæ: (a) *Affirm the Condition or Reason, affirm the Conditioned or Consequent*: (b) *Deny the Conditioned or Consequent, deny the Condition or Reason.* *Posita Conditione, ponitur Conditionatum. Sublato Conditionato, tollitur conditio. A ratione ad rationatum, a negatione rationati ad negationem rationis, valet consequentia.*

§ 158. The applications and modifications of these canons will be shown subsequently, in connection with Conditional Inference. Meanwhile it is enough to say that they involve the essential principles of all indirect or apagogical demon-

stration, so that many of the important demonstrations of geometry would be impossible without them.

§ 159. The function of the laws of Identity, Non-Contradiction, and Excluded Middle, as applied to synthetic judgments of contingency, or of contingent predicates, is purely hypothetical. In the synthetic judgment of experience, it is always a question as to which of the new contradictory predicates is to be joined to the subject. Whether *fusibility* is to be predicated of gold or not, is an open question for pure or mere thought. So is in fact every judgment of experience; every judgment fairly implying matter of fact. Whether *motion*, and *what sort of motion*, can be predicated as a condition of light, of heat, of sound,—all these are questions utterly insoluble for mere thought in any form. Here thought is perfectly blind. Every law of nature within the sphere of generalisation, that is, the great body of new predicates, in a word, of human knowledge,—all this is to be reached by processes not of thought, but of Intuition and Generalisation,—processes which thought may regulate, but which it does not constitute or illumine. Wherever a possible opposite can be placed, instead of an actual predicate or a supposed predicate, thought is helpless.

§ 160. But the function of the logical laws in regard to contingent predicates is twofold. First, of two opposites, one only can be attributed to the subject. If we say that *fusibility* and *non-fusibility* are possible predicates of *gold* before experiment, we are even then shut up to one or other as applicable. This is the result of the laws of Non-Contradiction and Excluded Middle. Secondly, we may hold thought in suspense as to the predication or non-predication of the supposed or possible attribute. Thus thought is indeterminate. This is the scientific attitude before experiment, and should be carefully distinguished as not really thought, but the suspension of thought. Thirdly, if we do predicate one or other of these attributes, fusibility or its opposite, we are required to do so on some ground of reason, or for some sufficient reason. This is all that formal logic demands; material or inductive logic, bringing into play other processes than mere thinking, will help us to ascertain grounds of sufficiency in the reason. Observation, analysis, generalisation, induction are now the processes whose aid is invoked.

§ 161. On this it may be fairly said that while Non-Contradiction cannot tell us of a new predicate,—this being due to observation, experiment, induction,—it yet negatively enacts that this alleged new predicate is not combinable with the concept we know, unless as non-contradictory of it, or of its other attributes. This is its logical application. And further, as logical thought is that of relation between concepts, or individuals and concepts, the terms of a judgment, the terms of a reasoning, it matters nothing to it whether the judgments of a reasoning are (materially) analytical or synthetical, provided only they are given or placed in the relation of the containing and the contained. Thus it matters nothing in a reasoning whether the major be a synthetical judgment or not. I may have as a major the synthetical *a priori* judgment that every event is caused. My reference under this major to a particular event as caused follows the same rule as if the proposition had been analytical. And the same holds true of all the generalisations of Induction. Further, in the mind of the thinker and speaker, every judgment is in a sense analytical, for it is the statement explicitly or by analysis of what he conceives of the subject, and knows of the subject, or as he enounces. So that logically, for the purposes of logical dealing and inference, there is no difference between analytical and synthetical propositions.

§ 162. While it is true, on the one hand, that Logic, as the science of the necessary relations of thinking can discover no new fact, or do anything in this way to amplify science, it can yet contribute to the progress of science. For it makes what is already acquired clearer, more distinct, more intelligible by classification and arrangement; it further helps us to see new relations among the materials accumulated.¹ Every time we reach the connection of two terms or notions of a matter of fact, through the connection of each of these with a common third which perhaps we had known before, —though we did not know the common relation of the notion to the other two,—we add a new truth to the stock of our knowledge, and we do this in virtue of the operation of logical law and the canons of logical science. Abstract these and our progress is paralysed. In the simplest instances this holds good. The unknown property or proper-

¹ Cf. Hamilton, *Logic*, L. iii.

ties of any physical substance may be revealed to us by finding that the substance belongs to a class which we knew before, although we now discover for the first time that it does so belong. Because we may at the same time know of some property belonging to this class which we now are able for the first time, in virtue of logical law, to predicate or conclude of the substance with which we started. Is this particular thing—this A—with which I am dealing, possessed of a particular property or not? Is it, for example, a poisonous substance or not? It belongs, I find, after the proper observational and experimental methods, to a class of things which I had not suspected—it belongs to B. All the Bs, I may already know, have poisonous qualities as part of their properties. I have now a certainty that A has those properties. I have here the knowledge of a new relation in which I can regard A. This is a new truth for me, in a sense a new fact, upon which I can act; and but for the aid of the canons of reasoning supplied by pure logic, working along with or after the methods of observation and induction, I could have no certainty of it. If a new planet is discovered, I can at once infer that it will exhibit in its movements conformity to the laws of motion, as established by Kepler and Newton, simply from a comparison of the notion of it with other planets which exhibit this conformity. In applying the general law to a new case, I widen the range of my science. And this is what logic teaches. It teaches the general or universal laws of pure inference, whatever be the matter or science in which we infer; and it helps to form the habit of the correct application of those rules. Clearly, too, it follows from this that Observation, Experiment, Induction, all the means by which we get the materials of knowledge, and the laws of facts, are prior to the strict logical process of inference, and that the analysis of this logical process is to be done independently altogether of the inductive methods. How we get our premisses is a point of wholly secondary importance in considering what these involve. It is enough for logic if they be given; it is indifferent even to it whether they be actually true or false; the science has a perfectly definite, and very wide sphere of inquiry, in tracing the laws and conditions under which these premisses are explicated, and their conclusion implicated.

CHAPTER XIII.

THE LAWS OF THOUGHT—HAMILTON AND MILL.

§ 163. The true nature and applications of the Laws of Thought are perhaps best brought out in confronting one view with another. In this chapter, accordingly, I shall present the antagonistic views of Hamilton and Mill, and in a subsequent one the doctrine of Hegel on the subject.

§ 164. On the nature of these laws of thought Hamilton remarks: "When I speak of laws and of their absolute necessity in relation to thought, you must not suppose that these laws and that necessity are the same in the world of mind as in the world of matter. For free intelligences, a law is an ideal necessity given in the form of a precept, which we ought to follow, but which we may also violate if we please; whereas, for the existences which constitute the universe of nature, a law is only another name for those causes which operate blindly and universally in producing certain inevitable results. By *law of thought* or by *logical necessity*, we do not, therefore, mean a physical law, such as the law of gravitation, but a general precept which we are able certainly to violate, but which if we do not obey, our whole process of thinking is suicidal or absolutely null."¹

Hamilton here very properly marks out the contrast between the operation of physical and of logical law. In the former case the law is a sequence, a necessary and inevitable sequence, at least hypothetically so, given the present constitution of things. The cause or antecedent being given, the effect or consequent must follow; there is no choice. The cause cannot select its effect, the effect cannot select

¹ *Logic*, L. v., p. 78.

its cause. Bodies gravitate, and they have not the power to disobey the law. Nor are they conscious of the sequence or law which they are fulfilling or exemplifying. In these respects, an intelligence, a free intelligence, though subject to law, differs from physical agents or causes. It is open to him to elect to obey the law of his intelligence or to disobey it. And when he obeys it, there is a certain degree of choice on his part. When, for example, he follows the law of Identity in his thinking, or applies it, and reasons from the whole or genus to the part or species, thus thinking consistently from *all* to *some*, he is so far electing to obey the law. When in the same way he thinks that A and not-A must be held to be different, or thought apart, he follows with a certain election the law. When he thinks that $2 + 2 = 4$, he obeys the law of consistent thinking. But he may disobey the law, and think inconsistently. He may imagine he infers from *some* to *all*; he may imagine he unites two contradictory attributes in one subject; he may imagine he thinks $2 + 2 = 5$. He may actually express all this in words. He does so every time he thinks or reasons inconsistently. His thinking, his concluding from premisses, is not necessarily valid; what he concludes, or says he concludes, may be inconsistent with what he laid down. The penalty for this is that his so-called or imagined thought turns out to be not thought at all, for the relation which he imagines he constitutes—say the union of contradictories, or $2 + 2 = 5$ —does not exist. The one half of the thought, so to speak, abolishes the other, and he has not the thought he imagines he has. He sees this as soon as he becomes conscious of the inconsistency. It was possible for him to go wrong, and he went wrong; it was not possible for the physical sequence to go wrong, and it did not go wrong. In this sense, and to this extent, the logical law is an ideal necessity, a precept which we may or may not obey, but it is also in the strictest sense a necessary, even inevitable law, or condition of really existing thinking, or of consistent thinking, for these are exactly equivalent. Logical law, thus, to a free conscious intelligence, may be stated in the form of a precept, as every rule of thought and action must; but this is not inconsistent, as Mill alleges, with the rule by law “in the scientific mean-

ing of the term." It does not make the *a priori* necessary law, "like laws made by Parliament," alterable and contingent; it does not deprive them of the character of "necessities of the thinking act," and make them merely "instructions for right thinking," or "general precepts which we are able to violate;" for they are still the absolutely indispensable conditions of any and all thinking, apart from which it is suicidal and null. Mill's reasoning amounts simply to a very pretty fallacy: Logical laws are precepts (Hamilton). Acts of Parliament are precepts (Mill). Therefore, logical laws and Acts of Parliament are essentially the same (Mill).

§ 165. Hamilton naturally and properly illustrates, in the first instance, the law of Identity of the whole and parts in Comprehension. Seeing that, as he teaches, Comprehension implies Extension, it hardly probably occurred to him that further illustration in Extension was needed. But Mill, *more suo*, thence at once infers that the law in Hamilton's view does not apply to the whole in Extension. To say that it applies to the whole in Comprehension is, forsooth, to say that it does not apply to the whole in Extension,—that this application of it in Comprehension is inconsistent with its application to the whole of Extension, which is yet in Hamilton's view, and properly, implied in the Comprehension!

§ 166. Hamilton does not say, as Mill represents, that the Principle of Identity is "the peculiar groundwork of any special kind of reasoning," and he does not deny but affirms that it is "an indispensable postulate [principle] in all thinking." All that he says is that the law of Non-Contradiction, of which the Principle of Identity is the primary phase, expressly regulates in this its first form, affirmative thought. Surely a man may be allowed to state one thing at a time without being held to deny everything else.

§ 167. Mill's own expression of the law of Identity is—"Whatever is true in one form of words is true in every other form of words which conveys the same meaning; or it is "the reaffirmation in new language of what has been already asserted." ¹

This properly speaking is not the principle of Identity; for this law does not regulate simply reaffirmation, and it applies to the elements of the proposition, or of what is true, in the

¹ *Examination*, p. 482.

first place. Subject and predicate must, in the first instance, be thought and kept in consistency with themselves, ere anything either true or false can be said. The word *true* unduly narrows the scope of the law. It extends beyond what is true in point of fact to what we can conceive as congruent or possible. Mill's formula is not a statement of the law, but of that which supposes and assumes the law, or a special application of it.

§ 168. Mill denies the principle of Identity to be "the principle of all logical affirmation."¹ It applies only to analytic judgments. If the predicate express a new attribute, not identical with what pre-existed in the subject, the principle does not apply. The reply to this is that the principle does not apply in the sense of enabling us to add the new predicate; but this adding the new predicate is not "logical affirmation." It is added on the ground of something external to the original concept and its attributes, either experience or *a priori* necessity. Hamilton does not deny affirmation other than logical, looking to the ground of the affirmation. But he denies that *any* kind of affirmation is not subject to the principle of Non-Contradiction in the added attribute as compared with the original: so that in the widest possible sense Non-Contradiction, implied in Identity, regulates *all* affirmation. Further, the synthesis or addition of a new attribute to a concept, is a process extra-logical, and to be completed ere we can deal with the full concept, and Logic does not begin to treat of a concept until it is given us. As given to Logic, the so-called synthetic concept is, however found, thus analytic.

§ 169. Hamilton says that "as the law of Contradiction enjoins the absence of contradiction as the indispensable condition of thought, it ought to be called the law of Non-Contradiction." But, says Mill, the law of Contradiction "is not an injunction; it does not enjoin the absence of contradiction any more than the law of Identity enjoins identity." What then do they do? The law of Identity means "that a proposition which is identical must be true;" the law of Contradiction, "that what is contradictory cannot be true." Does Mill really affect even to imagine that Hamilton said or meant that the law of Identity, as a condition of affirmation or

¹ *Examination*, p. 483.

thought, enjoined anything but that thought proceeding under it must affirm, not deny, the identity of the parts with the whole? Substitute for "true" in Mill's formula "affirmed," and you have Hamilton's meaning in the one case; and substitute for "cannot be true" "denied," and you have his meaning in the other case. If "the absence of contradiction be the indispensable condition of thought"—that is, thought at all, as opposed to fancied but truly non-existent thought, does not the law of Contradiction as a general principle or law enjoin this absence, and universally enjoin it?

§ 170. They are not the fundamental laws of thought, according to Mill; they are the laws of consistency. As such they are the fundamental laws of thought, for thought must be consistent ere it can be known to be materially true or false. And they are the only laws which are completely universal and necessary to logical thought. All others are contingent generalisations.

§ 171. Hamilton says contradictories cannot be thought together. "Most people," remarks Mill, "would have said be believed together; but our author resolutely refuses to recognise belief as any element in the scientific analysis of a proposition."¹ Hamilton was right, for the reason why they cannot be believed together is that they cannot be thought together. And further, Hamilton does recognise the fact that this incompatibility of thought implies an incompatibility in existence, which cannot be believed as possible.

§ 172. When Hamilton argues that A and not-A sought to be united annihilates thought itself, Mill replies that "this proves only that a contradiction is unthinkable, not that it is impossible in point of fact."² Thus, then, a contradiction is possible in point of fact,—a non-existent thought may represent a possible object of reality. There may correspond to zero in thought an actual real object!

§ 173. The law of Contradiction is with Hamilton "the principle of all logical negation." By logical negation it must be kept in mind that Hamilton means that negation which we are entitled to make in virtue of the form of the proposition. This is symbolised by *is* and *not-is*—by A and not-A. This is *a priori*, in virtue of the formal law. There

¹ *Examination*, p. 485.

² *Ibid.*, p. 493.

are other forms of negation which are not made in virtue of the purely formal law, as, for example, the negation of contraries or repugnants. *Red is not green; black is not white*, are negations, but not contradictory negations. These are founded on the facts of intuition, and the laws regulating the formation of concepts thence derived. The incompatibility is real and material. Indirectly, however, there are numerous cases that come under the principle of contradiction. Thus *red and not-red, black and not-black*, may be regarded as implied in the two judgments given. And when we put *white* (i.e., a *not black*) in place of the negation, the contradiction is efficient in the negation, though not the principle of the whole of it. Whether this should be called *logical* negation depends thus on the point of view. When we infer between contraries, we do so on the principle of contradiction. We deny of a particular colour that it is red; this yields us the inference only that it is some other.

§ 174. The laws of Contradiction and Identity are principles of reasoning in the sense of being "generalisations of a mental act which is of continual occurrence, and which cannot be dispensed with in reasoning."¹ In other words, they are at once contingent and necessary. They are the general statements of what continually takes place in reasoning, and they cannot be dispensed with in reasoning. If the latter, they are more and other than generalisations. They are in and constitute the process of the reasoning, the essential part of the reasoning. To generalise what is already supposed continually to take place, is itself a contradiction in terms. What continually takes place involves past, present, and future, and no generalisation can extend to this so as to give complete universality, far less tell us "what cannot be dispensed with." The generalisation here supposes alike a universality and a necessity which it cannot give.

But generalisation itself is impossible without them. In generalising I apprehend that *this* case is like *that*, and so on indefinitely, and conclude that the general law embraces the particular cases. If the law of Identity be not true,—if contradictory attributes are not necessarily excluded at every step in every generalising process—how can the generalisation move at all, or how can I reach the general law? But

¹ Refer to *Examination*, p. 487.

if generalisation presuppose identity and non-contradiction, how are these to be derived from the completion of the process? ¹

§ 175. To subvert the reality of thought by thought itself is a contradiction. It is to assert the reality of thought and to deny it at the same time and in the same act. We think that there is no thought. Mill, *more suo*, asks, "if the reality of thought can be subverted, is there any peculiar enormity in doing it by thought itself?" Simply this, that you would be asserting the reality of thought in subverting it. Does he really suppose as he writes, or does he imagine the least relevancy in this, "that if it were true that thought is an invalid process, what better proof of this could be given than that we could by thinking arrive at the conclusion that our thoughts are not to be trusted?" He adds, "Sir W. Hamilton always seems to suppose that the imaginary sceptic who doubts the validity of thought altogether is obliged to claim a greater validity for his subversive thoughts than he allows to the thoughts they subvert. But it is enough for him to claim the same validity, so that all opinions are thrown into equal uncertainty." There is no question here of more or less validity in thought, there is none simply of doubting even, none, properly speaking, of validity at all. The only point is, if I subvert the reality of a thought by asserting the (alleged) fact of a contradictory thought, be it concept or judgment, if I say that a contradictory judgment is and is true, that contradictories thus may be true, I subvert the act of thought in which I assert this, for in that case the contradictory of this assertion may be true. Thought is thus paralysed, and is unable in the absence of the test of non-contradiction to say anything whatever, to assert even its own reality, its own assertion.

§ 176. What is the bearing or scope of these laws, so far as existence is concerned? Hamilton's answer is that "whatever violates the laws of Identity, of Contradiction, or of Excluded Middle, we feel to be absolutely impossible, not only in thought but in existence. Thus we cannot attribute even to Omnipotence the power of making a thing different from itself, of making a thing at once to be and not to be, of making a thing neither to be nor not to be. These three laws

¹ Refer to *Examination*, p. 487 *et seq.*

thus determine to us the sphere of possibility and of impossibility; and this not merely in thought but in reality, not only logically, but metaphysically." "They are the laws not only of human thought but of universal reason." "Very different is the result of the law of Reason and Consequent. This principle merely excludes from the sphere of positive thought what we cannot comprehend; for whatever we comprehend, that through which we comprehend it is its reason. What, therefore, violates the law of Reason and Consequent merely, in virtue of this law, becomes a logical zero; that is, we are compelled to think it as unthinkable, but not to think it, though actually non-existent subjectively or in thought, as therefore necessarily non-existent objectively or in reality."¹

§ 177. Mill admits that these laws are laws of all phenomena, and as existence has no meaning but one which has relation to phenomena, we are safe in admitting them to be laws of existence. "Existence itself, as we conceive it, is the power of producing phenomena." But Hamilton cannot be allowed to hold that these laws are applicable to all existence. Why, we ask in wonder? Because his opinion is "that we do know something more than phenomena; that we know the primary qualities of bodies as existing in the noumena, in the things themselves, and not as mere powers of affecting us." Suppose Hamilton did hold that we knew something more than phenomena, which is notoriously false, how does this prove that he cannot hold these laws to apply to this something more? It is further in no sense true that Hamilton held the primary qualities to exist in the noumena: he does not use the word noumenon. It is borrowed from another philosophy altogether. It is further not true that phenomenon is to be limited to the meaning of "affection on us"—the assumption of such a restricted meaning as the only one is even ludicrous.

§ 178. In supposing a law of thought not to be a law of existence, the thinking process is not, according to Mill, thereby invalidated.² What law of thought does Mill here refer to? The only one in question at present is non-contradiction. Does the supposition of this not being a law of existence, while it is a law of thought, not subvert all truth, and make our thoughts about existence a mere

¹ *Lect. on Logic*, vi.

² *Examination*, p. 494.

illusion? If non-contradiction be possible in reality, and impossible in thought, how can thought represent correctly the real? What sort of a proof does he give of this? He says: "If the only real objects of thought, even when we are nominally speaking of noumena, are phænomena, our thoughts are true when they are made to correspond with phænomena: and the possibility of this being denied by no one, the thinking process is valid whether our laws of thought are laws of absolute existence or not."¹ Suppose the mind incapable of thinking noumena, capable of thinking only phænomena as coming from noumena,—suppose the mind under no necessity of thinking these otherwise than in conformity to what they really are,—then we may refuse to believe that our generalisations from the phænomenal attributes of noumena can be applied to noumena in any other aspect, without in the least invalidating thought in regard to anything to which thought is applicable.² In other words, contradictory attributes while they cannot be thought to co-exist in the phænomenal sphere, and cannot so coexist, may yet be believed to coexist in the unknown noumenal (unimaginable) sphere of being. What is impossible in the phænomenal sphere (perceived and imaginable), is yet possible in the unperceived, unimaginable, sphere of being; and therefore, if actual, thus true, and this possibility in regard to the unimaginable would not render invalid the (opposite) law in the sphere of the phænomenal—perceivable and imaginable. In the first place, the belief in the possibility of the union of contradictories, whatever they might be, is precluded by the nature of the so-called thought or judgment which is said to unite them. Such a judgment is null, has no object, is not real as a judgment. And Mill, of all people, should be ready to acknowledge that we cannot believe where there is no object of belief. In the second place, if the law of non-contradiction be true or certainly true only in regard to the existence we perceive and think or imagine, but not in regard to the sphere of things beyond and above this, which yet produces the perceived and imagined or phænomenal, then our whole knowledge may be only an illusion; for this phænomenal given as non-contradictory may be the product of what is in itself really and essentially contradictory.

¹ *Examination*, pp. 494, 495.

² *Ibid.*

Therefore, truth and falsehood, yes and no, right and wrong, make after all but the dream of the finite mind, which is for ever barred from the certainty of true reality. And though our laws of thought are not invalidated by this supposition in the phænomenal sphere, the phænomenal sphere is itself but an uncertain symbolism, perhaps a delusive appearance of its very contradictory.

CHAPTER XIV.

THE LAWS OF THOUGHT—THE DOCTRINE OF HEGEL—
STATEMENT AND CRITICISM.

§ 179. The general ground on which Hegel attempts to abolish the laws of Identity and Non-Contradiction is the assumption that Identity and Difference, as inseparable in thought, are the same thing, or at least are mutually creative,—that identity is only identity as it is not difference, and difference is only difference as it is not identity,—that each is not only itself but the special other of itself. This of course proceeds on the general assumption that what is necessarily connected in thought is so necessarily connected in existence, and that opposites are, in so far as real, mutually constitutive, in fact, mutually creative. The truth is, that while Identity and Difference are mutually implicative, alike in apprehension and thought, these are not thus mutually creative. They cannot be either apprehended or thought unless as relations already existing, and as existing in opposition as realities, while known together. Identity and Difference as mere abstract generalities are not possible, unless through special apprehension of identities and differences: and they are nothing more than terminal abstractions, unless as realised in this or that specific identity or difference; and these are not possible unless as forms of reality, which no thought of ours, or process of thought passing through us, can create. Further, if identity and difference disappear in a higher concept or reality, and this goes on without limit, or *ad infinitum*, there is no truth, philosophical, moral, or religious, in the world. And there is no basis possible even for this assertion itself. Identity and

Difference, truth, reality, and laws of thought, all thus ultimately disappear in a perpetual flow—in fact, a verbal chaos. The doctrine of Hegel may be thus summarily stated, almost in his own words:—

(a) “It is very important to conceive identity in its truth, that is to say, not as identity purely abstract, but as enclosing difference in itself. . . . Essence is only identity and radiation in itself in as far as it is negatively relating itself to itself, that is to say, repulsion of itself by itself: it contains therefore essentially the determination of difference. . . . Difference, as the mutual relation of two contraries, is determinate difference, difference in itself properly called, opposition, the relation of positive and negative. The positive is only positive in so far as it is not negative, the negative is only negative in so far as it is not positive. Each being thus only because it is not the other, each radiates in the other and is only by the other; each of the different has not an other in general in face of it, but its other; each is the other of its other. Difference is thus contradiction, relation of contradictories which reciprocally suppose each other.

“The positive is the same thing as identity, but not true identity, that is to say, determined as not being the negative. The negative is none other than difference itself; it is difference with the determination of not being identity. It is supposed that there is an absolute difference in positive and negative; but the two are in themselves the same thing, and we might call the positive negative, and *vice versa*. Thus the same obligation is a positive good for the creditor, a negative good for the debtor;—a way to the east is also a way to the west. The positive and negative are in essential relation, and reciprocally suppose each other. The north pole of the magnet cannot be without the south pole, the south pole without the north pole. Let one cut the magnet in two, we have not in the one piece the north pole, in the other the south pole. In the same way, electricity positive and electricity negative are not two separate fluids, subsisting the one without the other.

“Difference in itself gives place to the proposition,—of two opposed predicates only one can belong to the same thing, and to this,—between two contradictory predicates there is no middle. This principle of Contradiction expressly contradicts the principle of Identity, in so far that, according to the latter, the thing ought to be simple relation to itself, and that, according to the first, it ought to be relation to its opposite. It is by the intelligence which is proper to it that the understanding puts thus alongside of each other two contradictory principles without even comparing them. The understanding seeks to escape contradiction, and in doing so falls into it. It is pretended that A is necessarily +A or -A, and that there is no third term. But this third term is A itself; it is found by this even that one affirms that it does not exist. If +A signifies a distance of six miles to the west, -A an equal distance to the east, we may efface the *plus* and the *minus*, the distance does not the less exist. In physics

the idea of polarity is current, and it contains a more true determination of opposition. In place of saying that there is no middle term between two contradictories, as the understanding does, it would rather be necessary to say that all is contradictory. . . . Thus in nature, the acid is in itself at the same time the base, that is to say, its being is wholly being in relation with its contrary. The acid does not therefore rest quietly in the opposition; its tendency is to posit what is in itself, reuniting itself to the base. Contradiction is the essence of all life and all movement: it is the spring of universal activity, it moves the world, and it is ridiculous to say that it cannot be conceived.

"The positive is that difference, which is for itself, and which at the same time is in relation with its other. The negative is also for itself, and at the same time, as subsisting by itself, it is only a relation with its other."—(*Logik, Encycl.* § 115, 116, 119, 120, cf. Ott, *Hegel*, p. 192 *et seq.*)

Again (*Logik*, Part ii., p. 56), "Contrary and contradictory concepts—a difference which is here especially noted—lays the ground of the reflection—determination of difference, and opposition. They are looked upon as two special kinds, that is, each as firm for itself and valid against the other, without any thought of the dialectic and the inner nothingness of this distinction, as if that which is contrary must not be so severely determined as the contradictory."

"Species are contrary, so far only as they are different, to wit, through the genus as their objective nature have they an in and for itself being standing; they are contradictory, in so far as they are exclusive. Each of these determinations for itself is, however, one-sided, and without truth: in *either—or* of the disjunctive judgment is placed their unity as their truth."—(*Logik*, p. 107.)

Again, "Formal thinking makes for itself the determinate ground proposition that contradiction is not thinkable; in fact, however, the thought of contradiction is the essential moment of the concept."—(P. 342.)

§ 180. Now it is perfectly true that every cognition implies a relation, and that our highest concepts, logical and metaphysical, are known in relation to their contraries. We have thus *being* and *non-being*, *substance* and *accident*, *cause* and *effect*, and so on. We have *light* and *shade*, &c., in our sensible experience. But it does not follow, as Hegel assumes, that the one concept in the correlation produces the other, or that the necessary relation of the contraries or opposites implies the non-existence of their real opposition as factors in our experience. The knowledge of opposites is one, but the opposites known are not therefore one. These are two wholly different propositions.

§ 181. Identity is ambiguous, and of this ambiguity Hegel takes advantage:—

(1.) There is identity of the one or individual, as against the flow of time,—that which subsists the same or unchanged during successive moments is in our experience and meaning identical in the different moments. The best illustration of this is in the indivisible Ego of our consciousness, contrasted with its varying states and conditioning our knowledge of those states.

(2.) There is the identity of the one or individual as against the multiplicity of other individuals in experience. The individual is this, and not that,—this *now* as against that *then*,—this *here* as against that *there*.

(3.) There is the identity of the positive, as concept or proposition, against the negative of the concept or proposition.

(4.) There is the so-called identity, or rather unity and homogeneity of all being, both being in itself, and being in its individual or particular parts. All is one,—homogeneous,—or parts of the one homogeneous, call this Pure Being, or Pure Thought, or Pure Idea, or some common substance of whatever nature, supposing it to have what we can call a nature.

§ 182. Now, in regard to the first form of Identity known to us, difference is not deduced from it or created by it, for the simple reason that it is already a condition of our knowledge that the individual is one and the same, amid the lapse, change, or difference of time. And it is not true that the identity of the individual is the difference, or equal to the difference, or contains the difference. The difference as against the identity of the Ego in time is difference, and as against this the identity stands. Further, the difference is accidental,—any lapse of time may show it,—may illustrate it; but the unity or oneness of the Ego is unchanged, whatever be the particular flow of time in which it subsists. Then, just because the difference in some form is inseparable in cognition from the identity, it is inseparable in fact, and therefore true or real in fact, as a subsisting difference. It is not true that identity is only as it is difference, or difference is only as it is identity. They exist in thought and fact as mutually exclusive; and unless this be conceded, no step can be taken in knowledge, or anything result but simple verbalism. And even although it be admitted that the abstract concept of identity implies difference, this could never help

us in any case to the knowledge either of individual (or specific) difference, or of identity and difference. We may ring verbal changes as we choose, but *this* thing would be different from *that* in a way we thus did not and could not know, and it would be different as a reality and not identical.

§ 183. With regard to the second form of identity, viz., that of the individual as against the many in being, in time and space, there is here no fusion or equivalence of identity and difference. The individual as so conceived can subsist only as it is not the other, and the moment these are identified, or equalised in any way, individuality ceases. If any individual be another, it is no longer individual; if I be you, I am no longer myself. If every individual be every other, there is no longer any individual; if every Ego be every other Ego, there is no Ego. Hegel affords a perfect *reductio ad absurdum* of his vaunted principle when he argues that because an individual, say *this* man or *this* house, can also be called *that* man and *that* house, in of course a different point of view, *this* and *that* do not really distinguish individuals, but mark the identical!

Manifoldness in being or in individual being no doubt implies the possibility of likeness and unlikeness; but it cannot tell us anything as to what are like or unlike or wherein that lies. This is wholly a matter of experience, and cannot be created by us, though it may be apprehended or learned. Then, it is the greatest of mistakes to suppose that because things are unlike they are necessarily contradictory. Two atoms may be unlike in weight and property, but they still belong to the same class of things. "The function of the eye and that of the hand are very unlike, but they are both helpful in sensation and perception. The essential quality of contradiction is not mere unlikeness or even opposition, but absolute exclusion or incompatibility.

§ 184. With regard to the third form of alleged Identity, positive and negative are not convertible in any form of opposition. If they are contraries, the negation of one quality is opposed only by *some* other; if contradictories, the positive is opposed only necessarily by a simple negation. It may be opposed by a positive, but not necessarily. The negative has not an equal right to determine the positive; the positive is first and definite, and the negative is merely

indefinite, various. It subsists only through the positive, but not *vice versâ*.

§ 185. The fourth position is a pure hypothesis which it is the aim of the Dialectic of Hegel to establish, and in which it wholly fails by sheer internal inconsistency, as well as gratuitous assumption. Set up Identity and Difference as realities which deploy through contradiction, and so make the Universe. It is easy enough to play at world-making, but it is play only, and the world is never our world.

Being or thought is throughout the system assumed to be the same, while we know no such identity in our experience; but wholly different forms of being—spiritual and material: it clothes itself in difference or different forms, only to return always to a third form, which includes the first and second—identity and difference; and in the end it becomes the absolute or all expressly, the identity of identity and difference. The assumption here is that *is* means a universal being, which passes into every form of being and is the same or a unity all through under various forms. It is at the same time entire in every category into which it passes, and yet it is transitory through each category, and continuous to a term of absolute development, when it knows itself as the Universe and God; though as there is no limit to Reason there is no reason why the Absolute should not take a new turn and pass into something else, but every reason why it should. Though entire in each category, it is in each incomplete or untrue. It is only complete or wholly true in the last—Absolute Idea, in which all the categories are gathered into one, a unity of method or development. In other words, Being develops through difference or contradiction, to absorb in the end all difference and contradiction. It is absolutely identical; yet its essential movement is contradiction.

§ 186. But this general doctrine or theory cannot itself be adduced in disproof of the validity of the laws of Identity and Non-Contradiction. On the contrary, these have to be proved invalid, in the first instance, before the theory can be accepted. That identity passes into difference, negation, or contradiction is just the point to be proved: it is the point even which must be rendered conceivable. The assumption involved is certainly not intuitive; it is even contrary to appearance, to thought, and to fact as we know it.

§ 187. The place and power of negation are utterly misconceived and exaggerated in the system. In certain cases of opposition, one of the terms is merely the negation of the other. We may, for example, deny absolutely the alleged position of an object in space, or the existence of a person in time at all. The negation here gives nothing positive; it simply sublates or removes. And this holds in every case of the *is* and the *is-not* in its primary application to reality. The *is* or *is-not* supposes a definite subject of which we speak and think, and the one is simple affirmation of its reality, the other of its non-existence. Cause *is* or it *is-not*: God *is*, or He *is-not*. Peter the Hermit lived in the eleventh century; he never lived at all. But there are other contraries which are equally positive, but not necessarily related,—*e.g.*, *yellow* and *blue*,—*wise* and *foolish*. In this case, negation of the one does not give the other in any sense; but if the subject spoken of be capable of admitting the predicate of the genus, say colour, it is supposed to be indefinitely referred to some one kind of colour, we may not as yet know which. The thing being first of all supposed limited to a given class, and one of the members of the class being denied of it, it is supposed to be capable of being found in another member of the class. But this is a secondary process, not dependent upon the mere negation of the subject, as say *blue*, but on the previous affirmation or supposition that there is a class of coloured things, and that the thing we speak of is capable of belonging to that class, or admits of colour as an attribute. In fact, it is indefinite affirmation following from, and only possible through, a previous definite affirmation.

Now Hegel confounds these totally different kinds of negation, and misconceives the real ground and possibility of the last. The result is that we have constant confusion of contradictory and contrary opposition, and the constant assumption that the negation of a positive must give a positive.

§ 188. Then there are other cases of opposite terms in which both are equally positive—*e.g.*, *Cause* and *Effect*—*Substance* and *Accident*—*Ego* and *Non-Ego*—*Subject* and *Object*. Those specified are necessarily relative or correlative. They are opposites and they are positives. Their peculiarity is that if you think the one, you think also the other; if you affirm the one, you affirm the other. But if you negate the former, you

do not affirm the latter, nor in fact do you lay down anything positive by your negation. The negation of *cause* does not give *effect*, or the negation of *subject* does not give *object*. These are in fact a species of contraries.

§ 189. He further constantly proceeds on the counter mistake to this—viz., that every negation of a negation gives an affirmation. But this is ludicrously false. No doubt negative concepts frequently represent positive qualities—*e.g.*, *immortality* and *immensity*. Others again do not—as *powerlessness*, *insensibility*. In the case of mere existence, the negation of *not-is*, by *not not-is*, would restore the existence thus negated. But the question is whether the negation of a negative would for the first time and of itself give a positive—*e.g.*, this definite thing *is-not*. Here I suppress a particular subject. Again I say—this thing is not correctly stated as not-being so. The *not-is* is negated by *not*. It is *not not-is*. No doubt there is here now an affirmation. But an affirmation of what? Of the subject I started with,—not a new subject. It may be formulated thus—*A, not not-A, therefore, A. Red, not not-red, therefore red*. It is quite clear also that the mere negation never could give a third notion which would unite the *not* and the *not-not*. All that it can do is to enable me to recur to the subject from which I started. Yet the supposition that the negation of negation gives for the first time new conceptions,—is in fact synthetic,—runs through the whole logic of Hegel. It is even supposed capable, given merely a genus, to evolve by the negation of it the difference which characterises the various species; whereas every one must see that no galvanising or negation could do this, and that the true result in such a case is the negation simply of the genus itself.

(a) "Hegel makes the affirmative and negative in the relation of exactly the same force or value—*e.g.*, if the mathematical point be the negation of space, space is the negation of the mathematical point. Sight is the negation of darkness, and blue of red. Hegel speaks as if it were a matter of indifference whether we begin with affirmation or negation, as if we could as easily infer from the mention of the idea of darkness that of light, as conclude from light to darkness. But the negation of negation does not necessarily give an affirmation. Starting from an affirmation we may deny it and then make it reappear by negation of the negation. But something positive must be given as known, and this positive reappears when the negation is denied, but it is not

created in all pieces by the double negation. But according to Hegel all concepts, save abstract being, are only negations of negations. The double negation does not only reproduce the point from which it started, but begets a real affirmation superior to the first. Through the negation of the thing, we arrive at the thing by negation of that negation. But out of the ideas of affirmation and negation nothing can come but themselves. Hegel introduces *becoming*, but this is a mere interpolation, at once gratuitous and illegitimate. This is the very point to be proved; and it is not even attempted. *Becoming* is, in fact, assumed, and assumed from experience or motion in experience. It may contain *being* and *non-being*, but it is not given by affirmation and negation alone. In fact, it is impossible that negation of an affirmation, and then negation of that negation can give anything but the first affirmation, which was given, or assumed, or borrowed from ordinary consciousness and experience. There is no creation of any idea, there is the simple manipulation of material already to hand."—(Ott, *Hegel et la Philosophie Allemande*, pp. 96-101.)

§ 190. But Hegel alleges certain reasons against the existence and validity of the fundamental laws of thought:—

(1.) He urges that the law of Identity is contradictory in form, for every proposition by its form promises a difference between the subject and attribute or predicate. But the law of Identity says that A is A, or that A cannot be at the same time A and not-A. It is sufficient to say in reply to this that the form of the proposition does not promise a difference between subject and predicate, for in that case every proposition would be negative, which is not so. But the form of the proposition provides for a plurality of notions,—a subject and a predicate,—whether these be the same or different. When I say A is A, or the whole is identical with the sum of its parts, I state a proposition in valid form,—nay, I state abstractly the principle on which all affirmation proceeds.

§ 191. (2.) He objects further that it is ridiculous to say that *a planet is a planet*, &c. Possibly enough; but ridicule, as has been said, is not a proof of truth or falsehood. And it may be necessary to assert the identity of an object with itself, when it is sought to confound it with something else. We may be called upon to say that *a planet is a planet*, if a man says *it is not a planet but a fixed star*. One says *the system of Copernicus is that of Ptolemy*. I say no.—*The system of Copernicus is the system of Copernicus*—i.e., it is identical with itself, and not with a different system.

§ 192. (3.) He states the laws of Non-Contradiction and Ex-

cluded Middle thus : *Of two opposite predicates, one only can belong to the same thing. And : Between two contradictory predicates, there is no middle.* He urges that the law of Non-Contradiction expressly contradicts that of Identity, because the latter says the thing ought to be simple relation to itself ; whereas the former says it ought to be relation to its opposite. But the answer to that is that the two relations are in no way contradictory or mutually exclusive. A thing may be in relation to itself, and also in relation to its opposite. Nay, it *must* be both. Thus, *e.g., the mathematical point is indivisible.* Here I virtually state the relation of the point to itself, or its essential attribute ; but I no less implicitly state its relation by negation to the opposite attribute—viz., divisibility. I may state a relation by simple affirmation. *This is indivisible.* Or I may do it by negation of negation. *This is not divisible.* The Ego or Self is the Ego or Self—not one of its qualities. The Ego is *not* the non-Ego or not-Self. These are compatible statements ; they are, therefore, not contradictions. Nay, if the law of Identity were not previously true—that is, that a thing is what it is, or is identical with its attributes—neither the law of Non-Contradiction nor the law of Excluded Middle would have any sphere of operation. We can only exclude from negative spheres, when we have a definite positive to start from, and to make the positive other than it is, is to abolish it.

§ 193. (4.) He seeks to disprove the law of Excluded Middle thus :—

It is said, he alleges, that A is necessarily either $+A$ or $-A$. There is no third term. But, he adds, this third term is A itself ; it is found by this that we affirm its non-existence. If $+A$ signifies a distance of six miles towards the west, and $-A$ an equal distance towards the east, we can efface the more and the less (*plus* and *minus*), and the space of six miles still remains. How and where does the space of six miles remain ? The place is not six miles to the west, it is not six miles to the east of a given point ; its distance is, therefore, undetermined ; nay, it is left open to say it may lie to the north or the south of the point in question. What really remains is the concept of distance simply, or undetermined. We are not speaking here of contradictions at all, but of contraries under a genus.

But if we say definitely of a given subject called B, that it is either $+A$ or not $+A$, that is, that these are the only two kinds of B, we have excluded any third term. B must be one or the other, either $+A$ or not $+A$. Whether not $+A$ is $-A$ or A simply is not decided. We may say A is alternatively both $+A$ and $-A$, on the supposition that A is a genus, which contains species under it. But in this case we are not stating two contradictories, or mutually exclusive propositions, but simply two different kinds of the same quantity.¹ If Hegel had attempted to show a middle between the *equal* and the *unequal* in integral numbers, he would have tried something relevant, however fruitless or absurd.

The whole of Hegel's proof is thus simply irrelevant. The positive and negative illustrations which he selects from magnetism and electricity are simply relatives: these do not represent either Contrary or Contradictory Opposition. The *plus* and *minus* of a given or even indefinite quantity are merely contraries, not contradictories; they express different degrees of quantity. To confound these either with their relatives, or with contradictories, is the gravest error possible in a system of Logic.

§ 194. Aristotle, under the genus of Opposition, specifies Relation, Contrariety, Privation and Habit, Affirmation and Negation.² A Relative, according to Aristotle, is said to be what it is with reference to something else—*e.g.*, the *double* is the double of the *half*. Knowledge is what it is with reference to an object known. Hence things relatively opposed are said to be what they are with reference to opposites. In this respect, Relative Opposition is distinguished from Contrary Opposition; for contraries are not said to be what they are with reference to opposites. Thus, *good* is not the good of *evil*, but the contrary of *evil*; nor is *white* the white of *black*, but its contrary. On the other hand, *double* is the double of *half*, and *knowledge* is the knowledge of *object*. These are what they are by reference to opposites. They do not exist, and cannot be conceived out of relation, relation of contrast and opposition. But Hegel confounds the merely relative both with Contraries and Contradictories.

§ 195. But all this criticism on the part of Hegel is mere

¹ See above, p. 125.

² *Categories*, c. x., and below, p. 179.

trifling with the subject. The broad question is: Are there mutually exclusive conceptions in human knowledge? That there are such it is only trifling with meaning and intelligibility to deny. We have examples in a *thing being* and *not being*, in *consciousness* and *unconsciousness*, in *life* and *death*, in *yes* and *no*. Unless there be this reciprocal exclusion of predicates, yes and no, truth and error, right and wrong, are mere illusions of the understanding, to be finally absorbed in some generic identity of the speculative reason!

§ 196. There can be no doubt that contradiction is accepted as absurdity by the common consent of mankind, and as destructive of the very essence of human reason or knowledge. The understanding is satisfied that a notion or a proposition which involves contradiction, properly so called, is a nullity. Such a proposition can hardly even be called false. It is rather non-existent; it is a form of words into which we can put no meaning. Here one statement destroys the other. If, for example, a historian says: This man A. B. lived in the fifteenth century; another historian says,—no, he did not live in the fifteenth century or in any other. We know very well that these statements are exclusive of each other, and we should certainly be greatly astounded if the speculative philosopher were to appear on the scene and tell us that both statements are true; for everything is also the contrary of that which it is. We should very properly, I think, dismiss both him and his philosophy, and hold by the much-abused common-sense of mankind. If two systems give to me no guarantee but self-assertion or an appeal to consciousness, I confess that I feel constrained to accept that one which does not reverse either the facts of experience or history.

§ 197. Suppose we apply the principle for a moment to morals. We have what is known as the moral law. It is supposed to prescribe certain actions, even certain motives, and to forbid others. It is further absolute, imperative. We may be doubtful in some cases about *what* is right or wrong; but we know all the same there is a right and wrong. And we know also definitely enough that particular actions and particular motives are to be regarded as such. Veracity, justice, purity,—these are absolute things for us. Self-sacrifice is a law of moral life. Will it be maintained, for a moment, that the principle that everything is also the

contrary of what it is holds here? Is veracity, is justice, is purity, is self-sacrifice not separated each by an absolute *yes* and *no* from its opposite? Are the just and the unjust compatible things? When I resolve to do a certain thing, is irresolution not absolutely exclusive of the opposite resolution or action? What meaning can there be here in saying that every one of those notions is identical with its contradictory, or is a union of contradictories, which is the same thing? I confess I cannot see that on such a system there can be either truth or falsehood, right or wrong, at all. There is an everlasting play of *yes* and *no*, successively subverting each other. Each stage or movement is a third only of the truth, and as the *yes* and *no* of stages one and two gather themselves up into a third, called *yes*,—the truth develops. But then this new *yes* or notion begins immediately the same process, and the result of the whole is the absolute identity of things fully developed. At no stage in history or in individual life, do we know the whole truth. Every *yes* that is evolved is a partial falsehood, until we get to absolute identity in the end; and this only shows us how completely we were deceived in supposing that the difference of truth and falsehood, of right and wrong, were anything beyond mere temporary appearances or passing illusions. "If the end of man," says a writer, "be action, be the accomplishment of duty,—and if this be as it is the very negation of contradiction,—is it likely that human reason is to find its essence in contradiction? The moral law and the Hegelian method are in insoluble contradiction. You can choose which should go to the wall."

§ 198. Hegel, indeed, says in regard to some propositions, that these are not identical in the sense that being and non-being are—*e.g.*, *I am* and *I am not*. *This house is there or it is not*. But this does not mend matters. As has been well said, "the sense in which being and non-being are identical may be different from that which differences these propositions. But if everything contain contradiction, and if there be no affirmation which is not the negation of itself,—these propositions must be identical in his view, in virtue of the principle of contradiction itself. Every affirmation, the simplest as well as the most abstract, is equivalent to its negation, and thus it matters not whether we take the one form or the other." It

is here that practical absurdity shows the theoretical absurdity inherent in the system, and it is here that Hegel is found to recoil from the legitimate consequences of his own principles.

§ 199. Let the system be judged from the point of view of ordinary reasoning. Let it be tested by the possibility of reasoning itself. Does Hegel not seek to prove that which is to be proved, and not the contrary of it? He does not mean surely to say *no*, when he says *yes*. He proceeds as other people do, and as every one must, by the ordinary acknowledged canons of reasoning. Then has he established his peculiar system by this method? In that case, we must regard the foundation as utterly rotten. If he accepts the ordinary canons to any extent whatever, how is his system, which is wholly subversive of them, to be reconciled with them? On the other hand, if his system is based on the subversion of those canons, has he not at the outset assumed what he ought to have proved in the end? Is not thus the whole method a gigantic *petitio principii*?

§ 200. For the ordinary statement—viz., *That a thing which is cannot be the contrary of that which it is*, Hegel would substitute this:—*That everything which is is also the contrary of that which it is*. As grounds of a progressive development, neither formula is of use.

If we take the former principle, it is obvious that we cannot proceed by negation to a new idea—in other words, we cannot construct knowledge *a priori*. It is what is called an analytic principle—i.e., we can deduce from the notion of the subject any attribute involved in it; but we cannot in this way add to the notion of the subject, particularly, we cannot add incompatible attributes. From the notion, for example, of *organisation* we can draw out, as it were, the attributes of *growth*, and *end* or *purpose*, and *living form* conformed to this end, because we have already fixed these attributes as contained in the notion of organisation. The principle would keep us to these attributes and only to these—i.e., it would keep us consistent in our thinking about the object of thought.

But if you say that the object spoken of is also the opposite, or contrary, or contradictory of that which it is, you cannot add an attribute in this way. What would come of identifying, for example, organisation and its opposite? Or

of negating organisation? Yet it is supposed that simply by denying the notion you begin with, you can add a new idea to the notion, and finally unite this idea and the original notion in a third term, which again is a new idea. No progress in knowledge can really be made in this way. It is, in fact, simply a suicidal process. And if this be so, the whole system of Hegel is sapped from the foundation.

§ 201. The illustration which is usually given of this process is that of the growth of a plant or tree. We are supposed to begin with the germ or seed. This develops into stem, branch, leaf, &c. And finally there is the union of all these in the plant or individual thing. The germ or seed is spoken of as the universal or possibility of the plant; the stem, branches, leaves, &c., as the particulars or differences or negations of the germ. The union of all these is regarded as the individual thing or plant itself. These three points, universality, particularity, individuality, are called *moments*, and it is said that in this way human knowledge is developed, developed from the bare abstraction of pure being or pure nothing. The whole process, including the universal, particular, and individual, is called the *concept* or *Begriff*. This is the type of human thought, and of all thought human and divine. But the whole illustration is fallacious. In the first place, it confounds the order of observation, or, if you choose, thought, with the order of production. My mere seeing or thinking this order of development does not make the development itself. If I say so, I have assumed here that the order of my thought is the same with the order of being or reality, that, in fact, my thought is not only observational but creative, that thought of this order is the divine creative power working in me. Now I do not admit this general assumption, and I hold further that merely to state the observed order of the development of the plant, and to ticket it with certain big words, is to leave out of account altogether the essential element in the process, the causal or productive power at work, the life within the germ, which, working long silent and unseen amid the chaos and the decay of matter, gathers, assimilates, and at length evolves the form of beauty, grace, and symmetry,—that form which rooted in a darkness as of the tomb, yet spreads itself out in cheerful greeting to the light of heaven.

§ 202. But, further, this is no illustration or even analogy of the true concept of human thought, nor does it properly illustrate the so-called *Begriff* of Hegel. The seed or germ is said to pass into the root, stem, branches, leaves, and fruit. But how is this known? I cannot predict this from the knowledge merely of the germ or seed. I am not now dealing with a comprehensive or individual whole, but with a mere class or genus, which I have filled up by generalisation, and which I can unfold at pleasure. I never could tell how or in what way this germ would develop by any *a priori* process. No negation certainly of the germ would help me to this. This development is known through intuition or observation and generalisation. It is seen and followed by me, not made merely by my seeing it, far less by my thinking it out from the germ. If I associate the particulars, as they are called, of stem, branch, leaf, &c., with the germ, I do so not from an analysis of the notion of the germ, but from direct experience of what follows in certain circumstances. It is the germ in the soil and under atmospheric conditions whose development I follow,—not the germ as germ or seed in pure thought. The germ is here improperly described as a universal at all. It is not a genus or class embracing certain particulars, as *organised* embraces *animal* and *plant*. *Organised* can be predicated or affirmed of animal and plant. These are the species which it contains, and to which it is applicable. But stem, branch, leaf, &c., cannot be said to be kinds or species of germ or seed. You may say a plant is organised, or has organisation, but you cannot say that a leaf is a germ or seed. That would really be too absurd. And much less could you go the length of saying that the negation of the seed led you to the idea of the stem or branch, or gave you that idea in any way. The seed is not a universal, properly speaking; the stem, branch, leaf, &c., are not particulars, properly speaking. They do not stand to each other in the relation of genus and species. And as for the individual plant being the union of the genus and species, the thing is simply ridiculous. Genus and species are united in the individual. *Animal* and *man* are united in *this man*; but *this man* is not constituted by the union of these simply. Individuality is something higher than mere membership of a logical class. In this case, the colour *red* would be an indi-

vidual, because it happened to unite the *genus colour* and the *species red*. But red, though numerically *one* colour, is not exactly the kind of indivisible unity which constitutes each of mankind, or even the unconscious plant or tree which lives and possesses its own individual being.

§ 203. It is said in regard to limit in thought that the consciousness of limit transcends limit, that there is only limit in natural or unconscious things, that the moment we reach consciousness of limit, limit itself is destroyed. My answer to this is that so far from consciousness of limit destroying limit, this consciousness of limit is essential to consciousness itself. I never could be conscious unless in so far as I set up limit, either a not-self against myself, or a negative against my affirmation. If in the act of consciousness, I transcend limit, I necessarily transcend consciousness itself, and if I do so I pass into the sphere of the meaningless. You can no more abolish the eternal *yes* and *no* in truth, than you can abolish by a mere consciousness of limit right and wrong, virtue and vice, beauty and deformity, in the ethical and æsthetical spheres. Nay, the very assertion is suicidal. How can I know that consciousness transcends limit, and unconsciousness does not, unless I affirm that consciousness is one thing, and unconsciousness another—*i.e.*, unless I proceed on a principle of strict and definite limitation? I distinguish, define, and limit, in order to show that all limit is really impossible. I seek to show, in fact, that no gunpowder will explode, by using a train of gunpowder which explodes the whole magazine.

The truth is, that consciousness or knowledge, as we have it, is possible only under conscious limitation. Our thought is constituted by limitation; we may substitute one kind of limit for another; but we have no power of transcending limit absolutely, any more than the bird can outsoar the atmosphere.

PART II.

CONCEPTS AND TERMS.

CHAPTER XV.

CONCEPTS AS NAMED—TERMS—THEIR PRINCIPAL DISTINCTIONS.

§ 204. Term in the widest sense may indicate either the knowledge of an object (quality) apprehended by Outer or Inner Intuition, an object represented as in Memory or Simple Representation, or it may mark the concept of the Understanding, whether of an abstract quality, or of a subject (synthesis in one object) of a series of qualities. Term in the stricter sense of the word indicates the logical concept; and it is extended to individual qualities, or objects, only in so far as these typify a concept whether generalised or universal *a priori*; for it is essential to a term that what it signifies should be discriminated from what is signified by other terms, that is, it is only applicable where there is discrimination and distinction, therefore unity amid diversity, and this is a function of logical thinking.

§ 205. Simple Apprehension is wider than Conception, and has for its object individual quality, image, or concept, merely as a fact of consciousness. In every case, it involves a psychological or existential judgment; it affirms the reality of its object as a thing apprehended, as subjectively at least real. When Simple Apprehension realises the meaning of a

concept, it passes into Conception; because in that case the concept is thought as representative of an object whether real or ideal, it matters not. The further question as to whether we apprehend, intuitively perceive the quality of an external thing or object, or only an image of it, is a psychological point of importance. But the decision of it one way or another need not affect the character of the act of Conception *quâ* act of Conception. The laws of the act are the same in either case.

Simple Apprehension is usually limited to our grasp of the meaning of the concept, as *house, man, organised*. But there is no reason in the nature of the case why its object should not be the relation involved in a proposition, even that involved in a reasoning simply as apprehended, without actual affirmation or negation on our part. In fact, this was the ancient and proper extent of the sphere of Apprehension; for with the schoolmen term in its widest sense meant what *terminates* any act of apprehension; and this may be either incomplex, as individual quality, or simple concept, or complex, as the proposition.

While the term subjectively indicates the completion of the intellectual act, objectively as applied to the concept, it indicates limitation. A concept implies the limitation of its object through certain attributes, hence the *term* in language which indicates it has for its essential feature the marking this limitation, this determination, implying distinction from other concepts. Every term thus implies distinction in thought of one concept from another.

(a) Occam distinguishes the *indicative* from the *apprehensive* act. The object of the latter is a simple or incomplex knowledge of terms, propositions, or reasonings. By the former the intellect not only apprehends the object, but assents to it, or dissents from it; and this act regards the complex only, for in assenting we esteem as true, in dissenting we repute as false.—(*Sent. Prolog.*, qu. 10. Prantl, iii. xix. 753.)

§ 206. Words have been divided into *Categorematic* and *Syncategorematic*. The former are held to be significant by themselves, the latter only consignificant. The former fully signify the thing or concept, the latter do not so much signify as consignify. The noun is *categorematic*; the conjunction, preposition, adverb, and several pronouns only *syncategorematic*. This is properly a grammatical distinction. In the

synthesis of words, called *Speech*, there are words indicating subject and predicate and relations of these. The subject and predicate are, or may be, significant out of relation to each other, as indicating each a quality, qualities, or a class. The words of relation, such as conjunction, preposition, are properly significant in the synthesis or combination called the sentence. The logical copula *is*, is properly syncategorematic; it is only consignificant, that is, it expresses a relation between concepts supplied. The relation of course indicated by each of the consignificant words may be made an object of abstract contemplation, but still it subsists only as a relation in some sentence or other, not by itself as an independent or non-sentential object of thought.

(a) A categorematic word or term has a definite and certain signification. Thus *man* signifies all men, *whiteness* all whitenesses. It has a definite *suppositio*, or representative function. A syncategorematic word has no definite and certain signification, and does not signify anything distinct from what is signified by the predicate. As in arithmetic the cipher standing by itself signifies nothing, but added to another figure makes it significant, so the syncategorematic word, properly speaking, is not significant, but consignificant as added to another term. It may even give the predicate determinateness, and enable it to stand definitely for another or others. Such words are *all*, *none*, *some*, *whole*, *except*, *only*, &c. *All*, *per se*, has no fixed signification, but as joined to man makes the term stand for all men. So also are conjunctions and prepositions. *Significant* is here employed, according to the usage of Boethius, as meaning not merely something determinate, for *all*, *none*, &c., are so, taken *per se*, but as making significant or able to stand in the place of something in a certain manner—i.e., giving a term *suppositio*, or the function of representation.—(*Sum. t. Log.*, i. c. 4, p. 8.)

Significant and *consignificant* here are very much equivalent to abstract and applied. The syncategorematic word has a meaning of its own, as expressing only an abstract relation, conjunctive or prepositional, or adverbial or quantitative; but as not applied or realised in a definite subject or predicate, it has not yet a representative force.

§ 207. Term has two meanings—(1) as distinguished from speech (*oratio*), it denotes everything incomplex. (2) Strictly it denotes that which, taken significatively, can be the subject or predicate of a proposition. In this sense no preposition, conjunction, adverb, or interjection is a *term*. These are syncategorematic. These words taken simply or materially can of course be placed as subject or predicate of a proposition. We may say "*he reads*" is a *verb*, or "*all*" is an *adjective*, "*if*" is a *conjunction*, "*from*" is a *preposition*. But thus taken

they are not significant, in the sense of standing for or definitely representing anything in a fixed mode.—(Cf. Occam, *Log.*, i. 1, f. 2, 2 B.)

(a) "*Opos est nota, qua unum quid et simplex mente representatur.*—(Goclenius, *sub voce.*)

(b) I call that a term into which a proposition is resolved, as the predicate and that of which it is predicated, whether to be or not to be is added or separated.—(*An. Prior.*, I. i.)

(c) Occam makes the term "the proximate part of the proposition" (*pars propinqua propositionis*).—(*Sum. t. Log.*, i. c. i.)

(d) Speech, according to Boethius, is threefold—viz., written, spoken, conceived, the latter having being in the intellect alone. So term is written, spoken, conceived (*conceptus*). The concept or mental term is the intention or affection (*passio*) of the mind, naturally signifying or consignifying something, produced to be part of a mental proposition. Concepts and propositions composed of them are those mental words (*mentalia verba*) which remain alone in the mind, and which, as Augustine says, are of no language, and cannot be externally set forth, although articulate sounds (*voces*) as signs subordinate to them may be outwardly pronounced. Articulate sounds, however, are not properly significant of concepts themselves primarily and properly, but only secondarily of the same things, which are signified by the concepts of the mind. As the concept or affection of the mind naturally, from the nature of the thing, signifies what it does, and as the term spoken or written is according to voluntary institution, the term may change its significance at pleasure, but the concept cannot. In other words, the concept would cease to be the concept it is, or to be significant of that of which it was formerly the concept.

§ 208. The term may be a single word, or a plurality of words. The essential point is the preservation of the unity of the concept, as distinct from the unity of any other concept. That word, or series of words, is properly a term which is significant of the total concept of which the predicate is said, or which is predicated of the subject. Thus we may equally well designate the concept of *triangle* by the single term *triangle*, or by a *figure bounded by three straight lines*. We may equally indicate the same concept by *Centaur*, or by *an animal with the upper parts human, the lower equine*. The *metropolis of Britain* and *London*, the *first man* and *Adam*, signify respectively one and the same object. The concept *number* is that of *continuous addition of unity to unity*. The concept *binary* is that of *unity coalescing with another unity in one and the same number*.¹ These expressions are

¹ Wolf, *Logica*, § 34.

all equally limitative and distinctive. The single word has the advantages of brevity, convenience, and force.

§ 209. Terms have been divided into various classes, chiefly the following:—

- (1.) Univocal, Equivocal, Analogous.
- (2.) Singular or Individual, and General or Universal; corresponding in a measure to Proper and Common Nouns.
- (3.) Of the First and Second Imposition and First and Second Intention.
- (4.) Concrete and Abstract.
- (5.) Connotative and Non-Connotative or Absolute.
- (6.) Distributive or Sejunctive and Collective.
- (7.) Definite and Indefinite, or Infinite, Privative and Negative.
- (8.) Categorical and Transcendental.
- (9.) Relative and Correlative.
- (10.) Contrary and Contradictory.
- (11.) Of Possession and Privation.

§ 210. This division is founded on no clear principle, proceeds, indeed, on the confusion of several points of view. Some terms, such as the Abstract and Concrete, are so from the nature of the concept signified by them. The consideration of the distinction thus belongs to the nature of the concept. Other of the distinctions, such as the Univocal and Equivocal, may depend on the accident of the naming of concepts, and are mainly of grammatical import. At the same time, as the term is so often used as equivalent to the concept, and its distinctions treated as conceptual distinctions, it is necessary briefly to indicate the meanings of some of the names applied historically in the Classification of Terms.

§ 211. The distinction of terms as Univocal or Equivocal is obviously a grammatical one. A word or term may be equivocal, as Occam has remarked, but not a concept.¹ The univocal term or sign is that which is applied and subordinated to one concept. It may thus be predicated in one and the same sense of the many objects under the concept. The equivocal is that which, signifying many, or having more than one definite meaning, is applied but not subordinated or restricted to one concept. In this case there is not one common predicate, but as many predicates as there are

¹ Cf. Occam, *Sum. t. Log.*, i. 14, and Wallis, *Logica*, i. 3.

various meanings. Terms may be equivocal, through accident, or by design.¹ As examples we have *light*; *crab* (crab-fish, crab-apple, crab-tree, constellation).

An Analogous term indicates an identity of relation as opposed generally to an identity of feature or attribute—e.g., *the foot of a table and the foot of a mountain, the foot of a tree, the foot of a man*. The objects in themselves are not resembling, but they fulfil similar relations. These terms are only indirectly univocal. Besides Analogy strictly taken, Likeness in the things gives rise to similarity in terms. We speak of a *blade of grass* and the *blade of a sword*, though these have different functions. We say of a portrait, *This is the Queen*, though portrait and Queen are only resemblances. Terms of Simile and Metaphor come under Analogy and Likeness.

§ 212. The Singular or Individual term is opposed to the general or universal. The singular is logically that which, indicating an attribute or attributes, is not predicable of more than one object—as *Julius Cæsar, Edinburgh, Glasgow*. It may be taken as indicating the individual conceived as distinct from others, or from what is thought to coexist in a given moment of time or in another portion of space. The universal term is that which is predicable of many, as *man, city, mountain*. The Singular or Individual should not be confounded with the Particular, as is generally done. The particular refers to quantity, and is *some of all*. But it is not identical with the one or individual—in fact, is opposed to it as signifying an indefinite plurality. *Some men* and *Julius Cæsar* are by no means convertible. As already explained, the universality of the concept, and therefore of the term, is a potential universality. This lies in its being predicable of several or many. Concept and term alike, as each act and name, one in number, and not many, are singular.

(a) Logically the terms *individuum, suppositum, singulare*, are convertible; though theologically *suppositum* means *substantia* and *accidens* contains *individuum* and *singulare*.

Individual (individuum) has three meanings:—

(1.) That which is one in number, and not many. In this sense every universal is individual.

(2.) That which exists without the mind, which is one and not many, and is not the sign of anything, as *Socrates, Plato*.

(3.) The sign proper to one, called *discrete term*. As Porphyry says,

¹ Cf. Occam, *Sum. t. Log.*, i. 14, and Wallis, *Logica*, i. 2.

the individual is that which is predicated of one only. In other words, it is not predicated of anything which can stand for many in the same proposition.

A sign of this sort is (a) Proper Name, as *Virgil, London*. (b) Demonstrative Pronoun—*this is the man*, meaning Socrates. (c) Demonstrative Pronoun taken along with a common term, as *this animal, that stone*. The *supposita per se* of any common term are demonstrative pronouns taken along with the same term.—(Occam, *Sum. t. Log.*, i. 19.)

To these may be added designation by Emphasis, through custom or restricting circumstances, as when an Englishman or Scotsman speaks of *the Queen*, he means one person, the reigning monarch, Victoria. The use of *the City* by a Londoner, of *bird, fish*, &c., by sportsmen, implies either an individual or specific reference.—(Cf. Wallis, *Logica*, i. 2.)

(b) Occam gives us the true theory of the singular and universal. The *singular* is that which is one and not many. In this sense, every *universal* as a quality of mind predicable of many is truly and really singular, just as a word, though common by institution, is really singular and one in number.

But if *singular* mean that which is one and not many, and is the sign of any singular, no universal is singular, for it is the sign of many. There is no universal which is not one in number, and is only universal by signification, as Avicenna teaches. One form in the intellect is related to a multitude and in this respect is universal, for it is itself the intention of the mind, whose operation is not varied wherever you look. In respect of individuals this form is universal; in respect of the mind, one of whose forms it is, it is singular. A *universal*, therefore, is one singular intention of the mind itself naturally fitted to be predicated of many not for itself, but for the things themselves. In this respect, as predicable of many, it is universal; as a form really existing in the mind it is *singular*.—(Occam, *Sum. t. Log.*, i. 14.)

(c) The doctrine of Scotus was that the universal is in some mode without the mind, and in individuals, not indeed *really* distinct from them, but only *formally*. Human nature is in Socrates, which is contracted to *Socrates*, by one individual difference, which is, not really but formally, distinct from that nature. Hence there are not two things; the one, however, is formally not the other. This opinion Occam rejects.

(d) The universal of Occam is in the mind, has no existence out of the mind, and is a natural sign of things. The term again is a conventional or voluntary imposition of a sign on the universal; and has no import apart from this. To call such a doctrine Nominalism is a misnomer. It is a conceptualism, pure and simple, and it shows how closely the two theories approximated.

§ 213. The distinction of terms of the First and Second Intention has been already explained in connection with the definition of Logic.¹ A word further is required to show their relation to terms of the First and Second Imposition.

¹ See above, pp. 34, 69.

* *Impositio* and *Intentio*, as applied to terms, indicate an important scholastic distinction. It is found in Burleigh and Armandus (see Prantl, iii. 584, 629); but the distinction of names of the First and Second Intention can be traced at least to Avicenna. Occam has put the distinction precisely. Some names signify things beyond the mind; others the concepts of the mind; others significant words themselves; and there is the ancient distinction of names of the First and Second Imposition. Names of the second imposition are those imposed to signify names themselves, such as *noun*, *verb*, *pronoun*, *conjunction*, &c.; in fact, the different parts of speech, as in grammar, though syncategorematic words are sometimes excluded. Names of the first imposition are divided into names of the first, and names of the second, intention. Those of the first intention signify real things; those of the second concepts of the mind, as *genus*, *species*, *universal*, *predicable*. These indicate intentions of the mind, which are natural signs, or signs voluntarily instituted to indicate these. Second intentions thus mark what is predicable of the names of things regarded simply, or apart from their application to the things signified, in a word, the classes of predicables; and the abstract relations among the predicable classes or concepts.¹

(α) This distinction may, indeed, at least in matter, be fairly enough carried back to Aristotle, in his discrimination of First and Second Substances. First substance is that which is not said of a subject, and is not found in a subject, as *a Man*, *a Horse*. Second substance is the species or genus of first substances. *A man* is in the species *man*; *man* is in the genus *animal*. Hence *man* and *animal* are second substances.—(Cat. v., §§ 1, 2.) This corresponds pretty closely to First and Second Intention, and certainly may have suggested it.

§ 214. The proper distinction of Concrete and Abstract is that the latter may be taken as standing for any quality, accident or form, inherent in the subject, as *whiteness*, &c.; while the former indicates the subject or object of inherence as well as the quality, as *white*. At the same time, logically it seems impossible to conceive the quality as a pure abstract; it must be realised and thought in an individual subject. The difference is mainly a grammatical one.

Another application of these terms, already noticed, is that

¹ Occam, *Sum. Logicæ*, i. 12.

the abstract is regarded as that which is higher or superior in the order of generalisation, as *animal* in regard to *man*, or *living* in regard to *animal*; whereas the concrete represents the lower concept. The abstract is thus ultimately the highest in the scale of general ideas, the concrete the lowest, the species or even the individual.

(a) The scholastic usage in regard to concrete and abstract was much wider than the modern. Three points at least may be noted:—

(1.) The abstract term was used to stand for any accident or form whatever really inherent in the subject; the concrete for the subject of the same accident or form—as *whiteness*, *white*—conversely, *fire*, *on fire*.

(2.) The concrete was used to stand for a part, and the abstract for the whole; or conversely—as *life*, *living*,—*man is living*; he is not *life*.

(3.) Concrete and abstract sometimes stand for distinct objects, of which neither is the subject nor the part of the other, as *sign* and *significate*.—(Occam, *Log.*, i. 5.)

(b) *Abstract* and *Concrete* in Hegel have reference to what is called the development of the concept. The concept (*Begriff*) is a completed idea, which in its unity contains difference. The concept is a substance which contains all its being or properties in itself, and develops this fully. It has thus a number of moments; these grasped fully constitute truth. Each moment by itself is false. When the concept has arrived at the full development of its moments, it is *concrete*. Each moment of the unity taken by itself is *abstract*. It may be remarked on this, that as at any moment of the development, the concept is not completed, there can be no truth except in the Absolute Idea, and as then all differences are abolished or identified—even the finite Ego itself, there is no truth in time at all.

§ 215. An Absolute Term is one which is significant of some one concept or Object without anything conjoined to it; or it is that which does not signify something primarily and also something secondarily, but whatever is signified by it is equally primarily signified, as *Animal* signifies *Horse*, *Ass*, *Man*.

A Connotative Term is that which signifies something primarily and something secondarily. That which it primarily signifies is usually an attribute, and secondarily the subject in which the attribute inheres.¹

(a) In the definition of a connotative name, there is something straight and something oblique. Thus, *white* means something possessing white-

¹ Cf. Occam, *Log.*, i. 10; and Goclenius, *sub voce*.

ness. All concrete names of the first order are connotative, as *just*, *white*, *animated*. So are all relative names, as *similar*, which is defined as *that having a quality such as another has*,—those belonging to the genus *quantity*, as *figure*, *curvity*, &c.

Intellect is connotative, inasmuch as it means *power* and *act*, so *one*, *good*, *true*, *potency*, *act*, &c.—(*Sum. t. Log.*, i. x. p. 21.)

(b) The concrete term is divided into *absolute* and *connotative*, or, which is almost the same thing, into *substantive* and *adjective*. Substantive indicates that which subsists by itself, as *man*, *stone*, *colour*, *beauty*. Adjective is that which signifies a thing as being the accessory of another, as *human*, *coloured*, *beautiful*. All abstract terms are substantives; although they sometimes signify things which can exist only in a subject, they yet express them as self-subsisting, as *prudence*, *science*, *love*. These can be only in a subject, yet in view of the mind they are self-subsisting. They are substantive by the mode of signification.—(*Aquinas, Logica Minor*, Pars I. q. 1.)

(c) This original distinction of Absolute and Connotative Terms is of considerable importance; and it is unfortunate that in some modern works on Logic the proper use of *Connotation* has been perverted to designate the comprehension or attributes of a concept. For this we had already a perfectly unexceptional term, and connotation as thus applied is really misleading.

§ 216. The scholastic distinction of Concrete and Abstract terms does not seem well marked off from absolute and connotative. It is clear enough that the concrete represents something different from, or more than the abstract. Thus *just* and *justice* are not convertible. While we can say *the just is virtuous*; we cannot put *justice* as the subject of the same proposition.¹ Yet *just* as a concept, in its comprehension, contains no more attributes than *justice*. It differs from the latter in its connotation as signifying or consignifying a subject of inherence, or possessor of the quality *justice*. It is, in fact, the quality of *justice* conceived as inherent or possessed, that is, as realised in extension. Thus Occam was right in saying that in one respect concrete and abstract names are synonymous. Nothing is signified by *man* more or other than is signified by *humanity*, or by *Deity* than by the term *God*.²

§ 217. A Distributive or Sejunctive Term is a term indicating attributes common to many individuals, and belonging to each of the class,—as *life*, *sensation*, *motion*, to *horse*, *cow*, *mule*,—species of *animal*. A Collective Term indicates the repetition of the same or similar quality in a sum of individ-

¹ Cf. Occam, *Log.*, i. 5.

² Occam, *Log.*, i. c. 7.

uals, as *senate*, *regiment*, *army*,—that is, the quality which makes each a member of the body. These are made up of units repeated, and gathered into one whole. The collective term applies only to the individuals in their totality; the distributive is applicable to each individual under it. In the latter case we naturally say, *Each is* or *Every one is*, *All are*,—in the former, *The whole is*. We predicate only of the totality, as a singular, or of all considered as one. We can say of a *senate* or *army* what we cannot say of each man in it. *Man* is affirmatively predicable of Socrates, but not *mankind*.

§ 218. Logically a noun is called ἀόριστον, or *infinite*, better indeterminate or indefinite, by which all things can be named except those named by the finite—that is, determinate or definite noun, to which it is relative, as *Homo*, *Non-homo*;¹ *Albus*, *Non-albus*. This distinction is due to Aristotle, but he declines to call the indefinite a noun—"Not-man is not a noun, for there is no name which we can apply to it; it is neither an affirmation nor a negation; it is that which I would call an indeterminate noun, because it agrees equally to all, to being and to non-being."² *Not-man*, in other words, has no real determination; it designates all which is not the thing or concept spoken of, but it determines nothing.³

Boethius translated ἀόριστον by *infinite*; not a suitable word. Hamilton gives *indesignate*. The true place of the indeterminate term in Logic will be considered in the sequel.

§ 219. A Categorical Term is any term comprised in the Ten Categories of Aristotle. A Transcendent or Transcendental Term is one that designates a notion above or beyond the Categories. The Pseudo-Thomas gives six *transcendentia*—viz., *Ens*, *Res*, *Aliquid*, *Unum*, *Bonum*, *Verum*. *Res* and *Aliquid* are new. The others are given by Aquinas.⁴ Ægidius Romanus holds these six to be in the knowledge common to all things, and as belonging to the first conceptions of the intellect.⁵

With the schoolmen the transcendental term was held not only to transcend, but to include the categorical term or terms.⁶

¹ Cf. Goclenius, *sub voce*.

² *De Int.*, ii. 4. Waitz omits the last two clauses.

³ Cf. St Hilaire, *in loco*.

⁴ *Opuscula*, 42 f. iv. B.: see Prantl, iii. xix. § 274.

⁵ See in Prantl, iii. xix. § 355, p. 257.

⁶ See Aquinas, *Logica Minor*, pars i. q. 1.

Kant borrowed the terms, and gave each a different and both a new signification, though there is a hint of his meaning of *transcendental* in Ægidius Romanus, quoted above. Transcendent with Kant means what is entirely beyond experience, as given neither in a *posteriori* datum nor a *priori* form, and thus beyond the categories of thought, beyond knowledge in fact. Transcendental means with him the *a priori* or necessary conditions of knowledge, which as such transcend the contingent or adventitious data of experience, yet constitute the knowledge we have.¹

§ 220. A Relative Term is said to be what it is by reference to something else, or some other term. Thus, *double* is *double of half*.² *Father* and *child*, *debtor* and *creditor*, are ordinary relatives, and make up a complete thought. The term from which we start in apprehending a relation may be called the Relative, and that to which it is related the Correlative or Correlate. *Subject* is the relative; *object* the correlate. But each term may in turn be *relative* or *correlate*—thus, *Father* and *Son*, relative and correlate; or *Son* and *Father*, relative and correlate.

The true conception of Relation implies (1) Two terms, and (2) these apprehended in the way of constituting a whole, of which they are the parts, and which cannot be conceived as a whole without each of the terms. Relatives are the terms of a sundered totality, which is unthinkable apart from the union of the terms. Thus *King* and *Subject*,—*Half* and *Double*,—*Height* and *Depth*. These terms integrate or make up a complete thought.

§ 221. But relatives are not properly mutually convertible. For the relation regarded from the one side is not identical with, nay, is the converse of the relation viewed from the other. The relation, for example, of *Creditor to Debtor* is precisely the reverse of the relation of *Debtor to Creditor*. *You owe me*,—*I owe you*. Owning to me is not possible without obligation by you. The two terms are necessary, but the relation, respectively viewed, is by no means the same. The debtor side may here be regarded as the correlation. For the positive ground of it is, say, money lent, first of all, as a matter of fact. Thus the relative is constituted as against

¹ *Kritik, passim*.—Cf. Hamilton, *Reid's Works*, p. 762.

² Cf. Aristotle, *Cat. x*.

the correlative, in this case the respondent or defendant. So the relation of *Father* to *Son*, is not convertible with the relation of *Son* to *Father*; the one is the converse of the other. So with *Ruler* and *Ruled*, *Master* and *Vassal*. The relation of the ruler is that of authority, the correlation of the subject is that of subjection to authority. The master orders, the vassal or servant obeys.

§ 222. In simple relation the essential thing is a term, rather concept, positive and determinate, to begin with. Yet when explicated, or in determining it, this is found to imply another term, or concept, ere we can put meaning into it. Thus *Uncle* is meaningless, unless as we know he is uncle of *Nephew* or *Niece*; and so *Nephew* or *Niece* is meaningless, unless as we know *Uncle*. But *Uncle* is first of all a determinate concept implying all the attributes of *man*, and only on the ground of these is the relation, wholly accidental, of man as uncle to nephew or niece realised. The relation is possible, through a previous concept or reality; the relation in no way constitutes this, is, in fact, dependent on it, and this underlying positive or object would remain, whether the accidental relation were constituted or not. So that relation between terms or concepts never constitutes the reality of the term or concept; but is possible only through a definitely apprehended or comprehended object. As has been said, "relation is the accident of a thing, not considered absolutely, but as compared with some other thing. Its essence depends on comparison."¹ In fact, relation, ultimately analysed, means one of the accidents or properties of an object or concept. And the whole idea of reducing reality to relation is as suicidal in expression as it is untrue in point of fact. "There is a great difference," says Aristotle, "between a thing being relative, and a thing being that which it is, only because it is said of another thing." *Head* is head of some one, but its being does not consist only in this relation, as that of father in being father to son.² Even in regard to simple relatives, we cannot know anything to be relative, until we know that to which it is relative, and in what respect it is so relative. If we know a thing, as Aristotle remarks, to be a *double*, we must know that of which it is the double. If we know ten to be the half of another number, we must

¹ Wallis, *Log.* i. 10.

² *Cat.* vii., § 26.

know that it is twenty of which it is the half, and so on. If we know a thing as greater we must know that which is the less of the two. But this applies in a very limited way to the objects of knowledge. We may know an object, whose reality as an object does not in the least consist in the circumstance of its being a mere relation to another object, or depend on a relation of reciprocity in reality or cognition. In fact, mere being in the relation is not possible in existence, it is possible only as it is grounded by a definite or positive something which founds the relation. And the true place of relation alike in knowledge and being is the secondary one of property or attribute or reference to some other thing. All or even the ultimate relations of a thing we do not and can never know, its relations to all actual, far less possible, objects of experience. We may have a perfectly definite knowledge of an object without any pretension of this sort. The primary metaphysical relations are the necessary modes in which objects exist for us and are known by us. But these even do not constitute the objects; rather the objective, whatever that may be, constitutes them, is their real ground, and manifests itself through them. To say generally, as is done, that every object of experience is a relation, or constituted by a relation, is to assume the possibility of a relation, while there are not two terms or objects to be related. A relation in an object is either between the parts of the object itself, or between it and another object. In either case, the relation is grounded in something beyond itself, whether this be a point or object directly cognisable by us, or whether we have to pierce backwards to something which is only known to us in the manifestation of the terms of the relation. Mere relation, as an object of experience or knowledge of experience, is a pure and simple contradiction. Relation is only possible through things related; and its reality is founded on them.

(a) Founding on Aristotle, relatives are said to be twofold,—some are *secundum dici*, others *secundum esse*. The essence of the former does not lie in mere relation; the essence of the latter does so lie—that is, there is nothing in them besides reference to another in some mode. E.g., *scientia et scibile*,—*cognition and object*,—are relations *secundum dici*, for cognition is a real quality or act;—so *perception and percept*, so *quantity and quality*. But other relations such as *master and servant*, *father and son*, *husband and wife*, are *secundum*

esse ; for the essence of each relation is in the mere relation of *master to servant*, &c., and is nothing apart from this.

Again, there are four things to be distinguished in Relatives—viz., Subject, Ground, Term, Relation. Subject is always different from Term in real relatives—e.g., *Virgil is the author of the Æneid*. Here we have (a) subject in *Virgil*, ground in *production*, term in *Æneid*, relation in *authorship*.—(Cf. Duncan, *Inst. Log.* L. i. c. viii.)

In the distinction of relatives *secundum dici* and *secundum esse*, there seems to be a confusion between the fact of the existing relation, and the possibility of the subject of it entering into other similar relations with different terms. Every relation *quid* relation is that which the subject has or shows in a definite aspect. The relation of *knowledge* and the relation of *service*, even of *double* or *half*, are equally the definite or specific relations of two things, and subsist only through these ; though the subjects of them are not necessarily either identical with the relation or exhausted by it. Mere or pure relation as identical only with itself is an abstraction.

(b) In the case where an antecedent is supposed, and where what follows is limited or depends upon it for its place and import, we have more properly relation than correlation. This is chiefly the case in what are known as grammatical relatives—e.g., *The house which stands there*. Here *house* is antecedent, *which* is its relative. But *which* has no force apart from the antecedent. These are not properly correlatives ; for they are of unequal import and not convertible, so as still to preserve the knowledge of the relation. The latter supposes the former, but they cannot change places as in proper correlation.—(Cf. Note by Latham on *Correlation*, Johnson's Dict.)

§ 223. Contrary Terms indicate concepts or qualities that are most opposed in the same class, or general conception—as *good* and *evil*, *just* and *unjust*, *wise* and *foolish*.¹ But these are not connected or opposed as relatives proper. *Good* is not the *good* of *evil*, as *double* is the double of *half*. And contraries do not make up the total thought as simple relatives do. We can think what is good, a good, say, *truthfulness* or *justice*, without thinking untruthfulness or injustice as a part of it, as a necessary constituent of our complete thought of it, while we cannot think a double without thinking it the double of the half. When we think *justice* we do think *injustice*, but not as a part of *justice*. When we think the *double*, we do think the *half* as an essential part of the *double*. This is the only analogue of the Hegelian *other* ; everything is also the other of itself. But it applies only to a few limited relations, chiefly verbal, and in regard to these it is but a poor and inaccurate expression of the fact. In regard

¹ See Aristotle, *Cat.* vi.; *Met.* v. 10.

to the whole wide sphere of thought and experience, especially contrary opposition, it has no application, and is the merest illusion of verbalism.

§ 224. Contradictories as terms relate only to concepts, and they are usually marked in language by *not*, or its equivalent. The essential feature of contradictory terms is that they cannot be combined in the same indivisible act of thought, they are mutually exclusive, and if the one is thought, the other is sublated. Thus *man* and *not-man*, *mortal* and *immortal*, *being* and *non-being*, are contradictory terms. These cannot be joined in one thought of an object. In contradictories a first or positive concept or cognition is always presupposed; and the contradictory may be of two kinds.

(1.) It may be the mere indeterminate concept of negation, indicated by *not* or its equivalent, which only precisely signifies the negation of the positive and nothing more, yielding no determinate or significative concept, as *one* and *none*, *being* and *not-being*.

(2.) The contradiction may be a positive, like that which it contradicts. *Mortal* may be contradicted by *immortal*,—*life* by *death*—*existence at a given time* by *existence at another time*—*the equality of the three angles of a triangle to two right angles*, by their (alleged) *inequality*—*less* or *more*.

(a) In the former kind there is nothing positive. When we say *non-ens est ens*,—this is true only as far as *non-ens* represents the term of a proposition, but not as taken significatively. One opposite even may be predicated of another simply or materially, but not significatively—i.e., as standing for a definite object—*Non-dictio est dictio*, *Non-pars est pars*, *Non-vox est vox*.—(Cf. Occam, *Log.*, i. 36.)

(b) With Aristotle the term τὰ ἀντικείμενα does not necessarily imply contradiction. It designates the two corresponding terms of a definite relation. It may be translated by *Correlatives*. Of these Aristotle makes four classes:—

(1.) Those of Simple Relation (τὰ πρὸς τι), as *double* and *half*. These have only a reciprocal reality. Each is dependent on the other in thought and in fact. This is not the case in any of the three classes following—

(2.) Contraries (τὰ ἐναντία), as *good* and *evil*. These cannot be in the same subject together in the same respect, but may be in the same subject in succession.

(3.) Possession and Privation (ἔστις καὶ στέρησις), as *Sight* and *Blindness*.

(4.) Contradictories (κατάφασις καὶ ἀπόφασις), as *yes* and *no*. These cannot both be in the same subject at the same time and in the same

respect. Aristotle, however, holds that Contradictories do not properly belong to single terms or Concepts (*κατὰ μηδεμίαν συμπλοκὴν λεγόμενα*), but are made by affirmation and negation (*κατάφασις καὶ ἀπόφασις*).—(*Cat.* viii.)

§ 225. Terms of Possession and Privation, or Positive and Privative terms, are those which on the one hand signify positively some quality, and on the other signify negatively the absence of this quality, and yet indicate something other or opposite in its place,—as *sight* and *blindness*. These terms apply to defects in a given type of objects, and suppose a knowledge of this type or concept. Privation is thus absence of a quality from a subject which is capable of having it, or ought to be in it at a given time or in given circumstances, as *blindness*, *deafness*, &c., in a person,—or as *darkness* from noon, *death* in man or animal. *Truth* and *error*, *right* and *wrong*, *honesty* and *dishonesty*, may be taken as fair illustrations. The privation may be the result of circumstances or of a free act on the part of the conscious subject. Aristotle adds that possession and privation do not admit of a middle; and that they can succeed each other only in a determinate order. *Blindness* as a privative follows *seeing* as a possessive or positive; and not *vice versa*.¹

¹ On this and Opposition generally, see Aristotle, *Cat.* vii. viii. x. Cf. *Met.* v. 22, ix. 1.

CHAPTER XVI.

CONCEPTS: THEIR KINDS.

§ 226. Concepts may be best divided in respect of four grounds. They may be viewed (1) as to what is primary and essential in their own nature, (2) in relation to their objects, (3) to each other, (4) to the subject or thinker.

Under the first head, we shall have the concept as Comprehensive or qualitative; under the second as Extensive, or quantitative; under the third as involving various species of concepts, determined in Comprehension and Extension respectively; under the fourth we shall have the quality of the concept as Clear or Obscure, Distinct or Indistinct,¹ &c.

§ 227. The primary and essential element of a concept is that it is, or contains in it, an attribute or sum of attributes. This is the ground of the concept of the class: objects are classed as they possess resembling or corresponding attributes; and the real ground of classification is attribution. In other words, the comprehension of a concept is first; the extension follows, and is also limited by the comprehension or attributes contained in the concept. Concepts are, therefore, first of all regarded as Comprehensive, or containing attributes.

§ 228. Essence is really the common nature, attribute, or attributes, in a concept or universal—in a word, its comprehension. Whether this is properly constituted, according to the truth of things, is not to be determined wholly by logical laws—in fact, only very partially. But still we are able to say of any given object, regarded as having or lacking this

¹ Hamilton, *Logic*, L. viii., footnote p. 140, suggests a division analogous to this; but as will appear in the sequel that now given shows very important differences.

nature, that it belongs essentially or not to the class. And there are concepts whose nature or essence is determinable, necessarily, or not wholly by the mere data of experience, as *causality, substance, &c.*

If we take, for example, the concept *root*, we find that the attributes or marks which make it up are chiefly *tendency, from origin, towards the centre of the earth, with body, and fibres which absorb moisture.* These are the constituent marks, and may be said to form the essence of the concept. They are gathered from observation and generalisation. Innumerable questions are suggested by this essence, and we can regard it only as relatively adequate. But it will help us to distinguish spurious from true roots, as what is called the "creeping root" of Mint, which is not a root, but a subterranean stem.¹

§ 229. While comprehension refers to the attributes, this again implies objects in which the common attributes are embodied. These are regarded as classes, or concepts of classes, or objects of thought. This is the extension of the concept, which refers to the objects contained under the concept, to which it is applicable, or of which it is predicable. Thus *Man* has sub-classes under it, and is predicable of *European, African, Asiatic, &c.* The concept *root* contains under it, and is predicable of, *fibrous, conical, abrupt, lobed, granulated, fasciculate roots.* These sub-classes are usually plural, and hence Extension is quantitative. Comprehension is also ordinarily regarded as quantitative, seeing it contains, or may contain, a plurality of attributes; but as will be shown, this is not accurate. Comprehension certainly is not quantitative in the sense in which Extension is.

§ 230. A whole is that which contains parts. This applies to Physical Whole as that which is made up of several elements, each, it may be, different from the other, as an individual *tree* or *house*. This approaches the comprehensive whole, at least, as in the individual. The logical whole is properly that which is common to many. The universal is of two kinds, according to Causality, and according to Predication. Deity, as the sole cause, is the most universal; and in this sense singulars are separable from the universal. But the universal of predication means merely that which is pre-

¹ Hoblyn's *Botany*, p. 9.

dicable of, and indifferently signifies and stands for, many. In this sense it is opposed to the singular or concrete.¹

The old logical distinction of predication as *dici de*, and *esse in*, really proceeded on the difference of Extension and Comprehension. In the former case the concept, as universal, was predicated of all the particulars subject to it. These were called *Subjecta Predicationis*,—as *animal*, *plant*, under *organised*. In the latter case, the concept was said to be in the subject, or to inhere in the subject, as *whiteness* in *snow*, or *knowledge* in *man*. The subject was now *Subjectum Inhesionis*.

§ 231. The Comprehension of a concept is great or small in proportion to the number of attributes or qualities which it contains in it, or which constitute it. The Extension of a notion is great or small in proportion to the number of objects or classes of objects which it contains under it. When a concept contains but one attribute, or in as far as more than one attribute is not distinguishable in it, it is Simple. When it contains more than one, it is Complex or Compound. When the Extension of a concept is so small that it contains under it no species or only one object, it is called *individual*.²

§ 232. In a duly subordinated series of concepts, within a common sphere of relationship, the law holds good that as the Extension increases the Comprehension decreases; and as the Comprehension increases the Extension decreases. The maximum of the one is the minimum of the other. Thus to take one individual—say *Homer*—the related and rising line of concepts will be *poet*, *Greek*, *man*. Of these the individual notion is the most comprehensive, comprising as it does all the common and distinctive attributes. *Poet* is more extensive and less comprehensive than *Homer*. Certain attributes have been thrown out, and only such retained as are common to others also poets. *Greek* is still more extensive and less comprehensive. *Man* again has greater extension than *Greek* and less comprehension.

The lowest, most concrete, or comprehensive concept, the individual—say *Homer*—contains all the attributes of the higher concepts,—as *poet*, *Greek*, *man*. It is the condensation or concretion of the whole. It contains even more—

¹ Occam, *Log.*, i. 35.

² Hamilton, *Logic*, L. viii.

that is, all the individual peculiarities. And when we throw out his *blindness*, his being *a native of Chios*, &c., and think of him as *poet*, we do not say necessarily whether he was *Greek* or not; but as poet is part of the class *man*, which, in this instance, is the general class within which we are relating concepts, *man* is presupposed. All the same we can think of the essential features of *poet*, which are more than those of *man*, in contradistinction to the common features of *man*, and so restrict our view to a portion of the class. This is but an application of the principle involved in the old logical brocard:—*Abstrahentis non est mendacium*. As Wallis puts it:—He who considers *sugar* as *sweet* does not necessarily think it as *white*, neither does he deny it to be so.¹

§ 233. The processes by which we increase the Comprehension and diminish the Extension, and conversely, have been named Determination or Concretion, and Generalisation or Abstraction. If we start from the highest point of Extension,—say, *being*—we may add on attributes, and thus determine or restrict the sphere of the concept. *Being material*, *being spiritual*, imply a determination or restriction of the concept. *Being material* may be again determined by *organic*, *inorganic*; *organic* by *animal*, *plant*, &c. In this case we add on determining attributes, in virtue of which the application or extension of the notion is limited, while its comprehension or sum of attribution is increased. The logical part of this process is ultimately regulated by dichotomy, and that by the law of Non-Contradiction. We descend through the contrast of opposites, through the *is* and the *is-not*; the latter or negative sphere is filled up only by intuition and experience. We can get no positive attribute by the mere dichotomy, or by pure thought; but working under the abstract law or formula, consciously or unconsciously, we fill up the negative sphere through experience, or the analysis of the contents of notions gained from experience. Thus, if we take *material*, we can divide it into what is *organic*, and thus by implication into what is *inorganic*, or what is excluded as the negative. As yet we do not know what *inorganic* is, unless as the negation of the attribute *organic*; and it is for experience to tell us what things belong either to the one class or the other.

¹ Wallis, *Logica*, i. 22.

But the exclusion keeps our thinking distinct, and affords a form of classification as our experience grows.

(a) Kant's so-called law of logical affinity or continuity (*Kritik*, p. 510, ed. Rosenkranz) has been shown to be groundless. It imports that between all co-ordinate species, other or others intermediate are conceivable. This is unfounded—(1) in respect of mathematical species. All angles are either acute or right or obtuse; there is no intermediate species, though we may have varieties among the species through accidental differences of length of line, &c. (2) When the co-ordinate species are distinguished by contradictory attributes, as when *animal* is divided into *vertebrate*, and *invertebrate*, that is, with and without a spinal marrow, there is no intermediate species possibly conceivable.—(Cf. Bachmann, *Logik*, § 61; Hamilton, *Logic*, L. xi.)

§ 234. The counter-process of Generalisation is thus obvious. It is simply that process which is first applied to individuals, turned upon concepts themselves. Starting from the individual of experience, already subsumed under a concept, we abstract from one or other of its attributes; we thus rise to greater generality; and proceeding further in this way we at every step increase the generality, or extension, while we decrease the comprehension. From *Socrates* we can thus ascend to *philosopher*, *Athenian*, *man*, and so on upwards to the highest possible concept, *some being* or *being*.

Some attempts have been made to invalidate the principle of the counter increase and decrease exemplified in the relations of Comprehension and Extension. It is admitted that the higher conception has a narrower content but a wider extent than the lower, while the lower conception has a fuller content, but a narrower extent. It is denied, however, that the extent is increased or lessened by every lessening or increase of a given content, and that the content is increased or diminished with every decrease or increase of a given extent.¹

The grounds on which this view is supported seem to me to be insufficient and irrelevant. The very admission of the difference of extent and content between the higher conception and the lower seems to me to be inconsistent even with the denial of the uniformity of this difference. How, except through the attributes given in the concepts or classes, are we to know anything either of extent and content, or of their relations of decrease and increase? We may go beyond the

¹ Ueberweg, *Logic*, p. 135.

actually contemplated or contained attributes of the concept, and so make an increase or decrease; but this has no relevancy whatever on the relations of the subordinated concepts in the scheme of graduation with which we chance to deal.

It must be kept in mind that concepts subordinated in Extension are first of all referable to some common genus,—it may be of a very wide kind. And here it will be found that as you lessen the extent by adding on an attribute, you necessarily increase the content or comprehension. Take the abstract *substance*, or *something*. This is the concept of being at its widest extent. Add on the attribute *corporeal*, and you have a less extensive concept, *body* or *matter* as opposed to *incorporeal* or *spirit*. But *substance* or *something* certainly originally embraced this in its extension, which *body* no longer does. If you go still further downwards, and add on or determine by the attribute *life*, you have *animate* as opposed to *inanimate*. Add on *sentieney*, and you have *sentient* as opposed to *insentient*. Add on *rational* or *reason*, and you have *man* as opposed to *brute*. Under *man* you may have subdivisions or species, but ultimately you must come to the individual *Socrates*, *Plato*, *Paul*, *Peter*, &c.

Proceed conversely, by abstraction of the attribute, and you have a precisely counter result. The greatest sum of attributes is in the individual, *Socrates* or *Plato*. Go on abstracting an attribute, so as to make the individual less individual, or common to a species, you necessarily extend the concept which includes it, as you lessen the content or comprehension, and so of all the species in the ascending series. The fallacy of those who deny this law lies in not observing that in no case need we speak of the number of objects or classes actually to be found under the concept, but of their potential number, that is, of the actual and ideal objects possible under the class. And here the very form of our thinking shows that there must be a counter decrease and increase, or increase and decrease. For as attribute is the ground of the class, each time the number of attributes is lessened, the number of classes or species is lessened, and the compass of the genus increased. And conversely, as the number of attributes is increased, the number of species is increased, or the compass of the genus is limited by adding on differentiæ. It matters nothing whether in a given species there are more objects

under it, and more sub-species than there were species under the immediately proximate genus. This is a numerical difference, not a specific or logical difference. Species depends on attribute; and according as you have or have not an attribute to ground the species, you have or have not the species, and only the species, whatever be the number of objects or sub-species contained under it. "If we join the adjective *red* to *metal*," it is said, "we narrow the meaning much more than if we join the adjective *white*, for there are at least twelve times as many white metals as red. So with *white* man, and *blind* man. Thus, in increasing the intension of a term we may decrease the extension in any degree."¹

How does this bear on the point? What does it matter whether under the species *white* metal there are more metals than under *red*? Does not the genus *metal* take in all metals, whether *red* or *white* to begin with? And is not the species *white* metal but one species, whether the objects under it be greater or less than *red*? Logically, the extension of metal is diminished as much by *red* as by *white*. It is diminished to the extent of one species by each, and that is all. No doubt *white* man and *blind* man have a different extension; the former is much greater than the latter. It contains more species of man under it, or numerically more *men*. This is true, when we compare the one species with the other; and have ascertained from observation and experience the relative numbers under each class. But, as distinctively or in comprehension only two species, they are logically to us of equal, that is, any possible, extent. Besides, it may be said, in regard to *white* and *blind*, that these are not separated by any proper dichotomy,—that they are intersective concepts,—there being nothing in the one which excludes the other, and therefore not properly co-ordinate species under the genus. In fact, there is no true division of the genus, for whatever a proposition may promise, division at least promises difference, and, if it fails, ceases to be division. If we add to the intension by properly contradictory, or even contrary concepts, we must in a constantly uniform ratio diminish the extension. If we do not so in our division our process is futile.

¹ Jevons, *Elementary Lessons in Logic*, p. 40.

§ 235. Concepts are divided according to their mutual Relations. Concepts admit of comparison in respect (a) of Extension, (b) of Comprehension.

(1.) In respect of Extension, concepts viewed in relation to each other are (a) Exclusive, (b) Coextensive, (c) Subordinate, (d) Co-ordinate, (e) Intersective.

(a) Concepts are Exclusive, when no part or object contained under the one is contained under the other. Thus, *emotion*, *mineral*,—*mineral*, *plant*. This refers only to the Extension, of which we are now speaking. In Comprehension, or as sums of attributes, some attribute is common to all concepts. Thus, *existence*, real or ideal, is predicable of all concepts.

(b) Concepts are Coextensive, when the sphere of the one is convertible with that of the other, as *equilateral* and *equiangular*,—*living being*, *organised being*.

(c) One concept is Subordinate to another when it occupies a place or position in the sphere of the other, as *rectilineal*, under *figure*, *plant* under *organised*.

(d) Concepts or Species are Co-ordinate, when, while their spheres are exclusive, they yet immediately go to constitute the extension of a third concept. Thus *triangle*, *square*, and *polygon* are exclusive, yet they constitute *rectilineal figure*. *Man* and *brute* are co-ordinate under *animal*. Co-ordinates are thus always also opposed as species.

(e) Concepts are Intersective, when their spheres partly coincide, and partly do not. In this sense *white* and *cold* coincide; some *white* things are cold, and some not; some *cold* things are *white*, and some not.¹

§ 236. The Subordination and Co-ordination of concepts give rise to distinctions and names of the utmost logical importance, especially in Judgment and Reasoning. These are mainly Genus, Species, Difference, Generic and Specific.

In the Subordination of concepts, the higher, wider, or more extensive, is called a Universal or General Notion Concept, in contrast to the lower or less extensive, which is known as Particular; by Aristotle the former is called *νόημα καθόλον*, the latter *νόημα μερικόν*.

¹ On these distinctions generally, see Hamilton, *Logic*, xi. § 31; Krug, *Logik*, § 41.

(a) A universal, says Occam, is a concept (*intentio*) of the mind signifying many, for which it can stand (*supponere*). Therefore one concept distinct from another is predicated of the other, not indeed for itself, but for the thing which it signifies; accordingly, by such propositions it is not denoted that one concept is another, but it is frequently denoted that that which is signified by one concept is that which is imported by another.—(*Log.*, i. 25.)

§ 237. More definitely, the General Concept is designated a Genus (*γένος*), inasmuch as it contains an attribute or attributes common to several classes or concepts under it, and thus embraces those as part of its sphere; and the Particular Concept is designated a Species (*εἶδος*), inasmuch as while it too contains an attribute or attributes common to several classes or individuals under it, and thus embraces them in its sphere, it is itself regarded as a portion or class under the wider concept or Genus. Abstraction or Generalisation employed on concepts to carry up the lower to the higher, the species to the genus, is called Generification. Determination, which evolves by attribution species out of genera, is called Specification.¹

Genus and species as considered in Logic have thus nothing to do with the question of natural science as to whether all species of plants or animals have arisen from one common source, and have thus acquired actual diversity through evolution—whatever that may mean. This is a scientific question of fact and a metaphysical question of origin and reality. Logic only seeks to legislate for the forms in which science has to put its observation, generalisation, and classification of the actual identities and diversities of our experience. Logic does not venture so far back in time or so high in speculation, but, if limited, it knows what it means.

(a) Genus is that which is predicated of several differing in species, in respect of the what (*in eo quod quid*). When the genus is predicated of the species, it is meant that that which is imported by the predicate is that which is imported by the subject.—(Occam, *Log.*, i. 20.)

Genus is usually said to be predicated *in quid*—that is, in answer to the question—*What is the thing? What is he?* He is an *artist*, or *doctor*, or *lawyer*.

§ 238. A Genus or Universal is regarded as a whole, inasmuch as, in Extension, it contains species or classes of

¹ Cf. Hamilton, *Logic*, L. xi. § 85.

objects under it, of which it is predicable. It is thus only *potentially* a whole, that is, it is applicable to or predicable of an indefinite number of objects, actual and ideal. *The species under it represent the parts of the whole or the classes of which it is predicable. A species is itself a whole in respect of the individuals under it. The individual is the part, and it is logically individual, inasmuch as it is not predicable affirmatively of aught but itself.

In Comprehension, the Individual is a whole, inasmuch as it contains a sum of attributes, which may be represented in different concepts and in the unity of the individual. This is the whole of real existence, of time and space, and here the real and the ideal or logical may coincide. The Genus is a whole properly in Extension, and is, strictly speaking, ideal. The Genus contains the species extensively; the Species contains the genus comprehensively.

(a) Occam's view is that genus and species do not differ as whole and part. Genus is not a part of the species, nor species a part of the genus. Genus is the sign of many, species of few; *animal* imports all animals, *man* all men, that is fewer objects. Genus and species equally signify a whole; but the genus signifies more individuals than the species. In this sense the species may be taken as the subjective or subject part.—(*Log.*, i. 21.)

§ 239. Genera are of two degrees—(1) The Highest or Most General Genus (*γένος γενικώτατον*, *genus summum*, *generalissimum*) is that which, being a genus, cannot become a species or form a portion of a class higher than itself. It is that of which, universally taken, any genus is not predicable.¹ (2) Subaltern or Intermediate Genus (*γένος υπάλληλον*, *genus subalternum*, *medium*) is that which, being a genus, can also become a species.

Species are also of two degrees—(1) Lowest or Most Special Species (*εἶδος εἰδικώτατον*, *species infima*, *ultima*, *specialissima*) is that which, being a species, cannot become a genus. Most Special Species is a concept having no species under it, or is predicable *in quid* of no class universally taken. (2) Subaltern or Intermediate Species (*εἶδος υπάλληλον*, *species subalterna*, *media*) is that which, being a species, may also become a genus. Subaltern Genus and Subaltern Species

¹ Occam, *Log.*, i. 21.

are thus the same.¹ The Species Infima can contain under it only individuals or singular instances of the species, numerically distinguished.²

A highest genus is usually that concept, in a certain order of gradation, beyond which observation and generalisation have not yet advanced, or beyond which it is not necessary to advance, for the special purpose in view. But absolutely or objectively viewed, it may not be the highest. *Being* or *something* may be regarded as the only highest genus; for this would hold even of Deity or a Universal Cause. This is in everything that is, whether created or uncreated.

As an example of a Summum Genus in a lower sphere, we may take *figure*. The concept of *figure* is *bounded extension*. It may be said *extension* itself is genus of *figure*, and embraces equally *bounded* and *boundless extension*. But *figure* ceases to be figure the moment the boundary of the extension is removed. We have, therefore, in *figure* itself a highest genus; because it cannot be a species of its opposite or contradictory.

A lowest species, absolutely, it is impossible to reach; for differences may always be conceived, say of varying degree, in the characteristic attributes of a species, so as to constitute a sub-species. But the logical requirements of thought are satisfied, if the individual under a species be conceived as embodying the attributes of the species, whether the individual be real or ideal. This individual, if it cannot be made again the matter of division into other individuals of time, or of time and space, is regarded logically as the individual. "The Highest Genus in a science is the most general class, whose properties that science investigates; the different Lowest Species, the classes at which that special investigation terminates. In geometry, for example, the highest genus is magnitude in space; the *infimæ species* of triangle are equilateral, isosceles, scalene. The geometrical properties of the figure are not affected by any further subdivision."³

§ 240. In a series of subordinate concepts, we have Proximate and Remote Genus and Species. The nearest is that

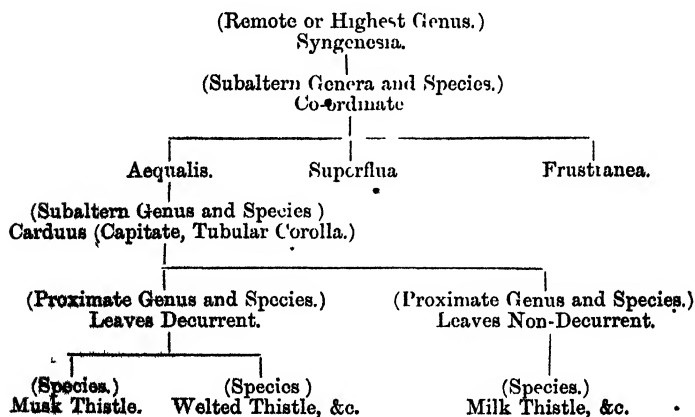
¹ Cf. Hamilton, *Logic*, L. xi., par. 36.

² Cf. Porphyry, *Isagoge*, ii., where all those distinctions and terms are explicitly given. Cf. also Aristotle, *Topica*, i. 5.

³ Mansel, *Prob.*, p. 199.

immediately higher in the line of ascent,—this is the *proximum genus*; the next superordinate is the remote, *genus remotum*, and this increases in degree as we ascend in the scale. Thus, take the series, *body, living, animal, man*,—*animal* is proximate, *living* remote, *body* still more so. This distinction is readily applicable to species also. Its use and application are seen in definition.

Take the concept *thistle* (*carduus*). This may be divided according to specific differences into *natans* (*musk thistle*), *marianus* (*milk thistle*), *lanceolatus* (*spear thistle*), *arvensis* (*field thistle*), &c. &c. These all belong to the genus *carduus*, and the mark of this is that the *corolla is tubular, generally spreading, so as to form a hemispherical head*, as opposed to the *ligulate or strap-shaped corolla*. This again, the *carduus* the capitulate or headed-flower class, belongs to the higher genus (order) *aequalis*—that is, *having the florets all perfect, each having five stamens and a pistil*. This order, subaltern genus and species, is referred to the remote genus *Syngenesia*—that is, the class of *plants bearing compound flowers, having their anthers united in a tube*.



§ 241. Difference is that which distinguishes species under a common genus, and which joined to the genus makes the species; as under *body* we have the difference of life and its absence, giving *animate* and *inanimate* as species of *body*.

"Difference," says Porphyry, "may make an other; or it may indicate merely a change in the same. The difference *reasonable* joined to *animal* makes an other—viz., *man*; the difference of *moving* as opposed to *being at rest*, only makes a change in the same. It is by difference that makes an object other, that genera are divided into species."¹

Difference is Divisive and Constitutive; the former when, by means of it, we divide the genus into its species as opposed,—as *animal* into *rational* and *irrational*; the latter when, by adding it to the genus, we constitute the species, as *man* by *rational animal*.²

If we take the concept *ranunculus* as, say, *a plant of five sepals, caducous, some of the petals with nectariferous gland at base, &c.*, we shall divide this into its species by difference, and at the same time so constitute the species. We find *leaves simple*, *leaves divided*. Under the former are the species *less spear wort*, and *pile wort*. Under the latter, we have *wood crowfoot*, *buttercup*, *meadow crowfoot*, &c. Thus, too, the *brome grass*, or *soft brome grass*, is distinguished from the *festuca* or *sheep's fescue grass* by being *awned*. The *festuca* is, as a rule, *awnless*; and when *awned*, the *awn* is not in normal form.³

In the class *loliun*, or of *flowers in spikes*, we have *rye-grass* and *bearded darnel*. The differentia is in the one case *spikelets longer than the glumes*; in the latter, *spikelets shorter than the glumes*.

§ 242. Difference is Generic, Specific, or Individual. The attribute, or sum of attributes, which distinguishes a lower genus or species from the higher genus under which it stands, and from the other species which are co-ordinate with it under that genus, is called the Generic or Specific Difference (*διαφορὰ γενική, διαφορὰ ειδική, differentia generica, differentia specifica*). Specific Difference is of the *Species Infima* only,—of that which being a species can never be a genus. As an example of generic and specific Difference, we may take *sentient* as common to *animal* and *man*; of specific Difference, *rational* as belonging to the species *man* only. The attribute or attributes by which an individual or singular is distinguished from the species which contains it, and from the

¹ *Eisagoge*; iii. 5.

² Cf. Porphyry, *Eisagoge*, iii. 12.

³ Hoblyn's *British Plants*, p. 30.

other co-ordinate individuals under the species, is called the Individual, Singular, Numerical Difference (*differentia individualis, singularis, numerica*). As subaltern genus and subaltern species are the same, the difference is called indifferently generic and specific.¹

(a) Difference is a concept expressing a determinate part of a thing, predicable in *quale* (*what sort*) of the same things of which the species with which it is connected, predicates in *quid* (*what class*). Difference expresses a part, not the whole, because then it would not be distinguishable from the species. It expresses further a part and nothing extrinsic, because otherwise it would be either property or accident. Difference is always concrete. It is predicated of the same things of which the species is predicated, and is convertible with the species. Thus *life* is not the difference of the *living body*, but *living*; and *rational*, not *reason*, is the difference of *man*.—(Occam, *Log.*, i. 24.)

§ 243. Difference as predicable of the species is predicable of the individuals under it,—as *rational* of *man* and *Socrates*. The Genus and Difference are said to make up the essence, or essential attributes of the concept. While the Genus answers the question—*Quid est*—*what is the thing?* the Difference answers the question—*Qualis est*—*of what sort is the thing?* As Difference, taken along with the Genus, completes the concept or the essence of the concept, it is also said to be predicated in *quale quid*—that is, it tells the kind of the what. The Essence (*Essentia*) was regarded as equivalent to *Quidditas*; but this did not mean simply the Genus, but the Genus and Difference combined. These constitute the Essence in the proper sense of that term. .

§ 244. Concepts viewed in Comprehension either coincide or they do not, that is, they either do or do not comprise the same character. "Notions are thus divided into Identical and Different. The Identical are either absolutely or relatively the same. Of notions Absolutely Identical there are actually none; notions Relatively Identical are called, likewise, Similar or Cognate; and if the common attributes, by which they are allied, be proximate and necessary, they are called Reciprocating or Convertible."²

§ 245. Concepts in comprehension, viewed in relation to each other, "are said to be either Congruent or Agreeing,

¹ Hamilton, *Logic*, L. xi., par. 38; and Krug, *Logik*, § 35.

² Esser, *Logik*, § 36, quoted by Hamilton, L. xii., par. 41.

inasmuch as they may be connected in thought ; or Confictive, inasmuch as they cannot. The confiction constitutes the Opposition of notions. This is, twofold : Immediate or Contradictory Opposition, called likewise Repugnance ; and Mediate or Contrary Opposition.”¹ In the former case, one concept abolishes by simple negation what the other posits ; in the latter it abolishes this through the affirmation of something else.² This distinction properly falls to be considered under Judgment.

§ 246. Concepts compared together in the relation of comprehension are further Intrinsic or Extrinsic. “The former are made up of those attributes which are essential, and, consequently, necessary to the object of the notion ; these attributes, severally considered, are called Essentials or Internal Denominations, conjunctly the Essence (*οὐσία*). The latter consist of those attributes which belong to the object of the notion only in a contingent manner, or by possibility ; and which are, therefore, styled Accidents, or Extrinsic Denominations.”³

This raises the question of the distinction of Essence, Property, and Accident in concepts. The Essence or Essential attributes of a class representing the order of experience must in the end be determined by observation, experiment, induction. And our knowledge of this is relative to scientific progress in the direction of finding the ultimate or grounding attributes of things. It is just possible we may never reach absolutely ultimate knowledge in the matter. In pure science, such as geometry, we get at essence completely for the purpose of the science by definition, or, it may be, hypothetical construction. In observational science that attribute or feature is naturally fixed on as essential which gives the distinctive character to the concept, or which is subservient to what may be viewed as the function of the object. Thus the *stamen* of a plant consists generally of two parts—*filament* and *anther containing pollen*. The latter feature alone is regarded as essential to the concept *stamen* ; the former not, for the reason that the stamen would cease to be stamen or to fulfil its function without the *anther containing pollen*,

¹ Aristotle, *Cat.* vi. ; *Met.* vi. 10 ; Hamilton, *Logic*, L. xii., par. 42 ; and Drobisch, *Logik*, § 25.

² *Ibid.*

³ Hamilton, *Logic*, L. xii., par 43 ; Krug, *Logik*, § 39.

whereas the presence or absence of the *filament* would not affect this.¹ Obviously we must be content provisionally to fix on features as essential, otherwise we could make no progress in knowledge. Our view, however, is at the best relative and approximate, so far as the nature of things is concerned.

The concept *force* enters into the concepts *gravity*, *cohesion*, *chemical affinity*. It is essential to each, as we find in experience. But these three concepts are still to us essentially different. Gravity acts at a distance; cohesion on the particles of a body that are near or in juxtaposition; chemical affinity only on bodies of different kinds. This difference, however, may be only provisional: it may be relative to the progress we have made in the knowledge of *force*; and it is not impossible that these forms may all be modifications of one common force,—the particular mode in which it is varied in its action in each of the three cases being unknown to us.

§ 247. Logicians, following Aristotle, have defined Property as that which, while it does not constitute the essence, or part of the essence of the subject or concept, yet follows, results, or flows from the essence as a necessary consequence. Thus, if we take as the essence or concept of a straight line "*that which lies just (evenly) (ἐξ ἴσου)*" as Wallis puts it, "*between its terms,*" it follows that, *of all the lines between the same terms (or extremes) it is the shortest.*" This is a property following necessarily from the concept of *straight* or *right line*. From the same concept of *right line* it follows also as a property that it is the only straight line between the two extremes. Thus while Difference is the *essentiale constituens*, Property is the *essentiale consequens*.²

§ 248. Hence Property, as immediately flowing from Essence, in the sense already explained, is that which belongs to a class or species,—*all, sole, and always,—omni, soli, et semper*. And hence, also, in regard to property as in regard to difference, the proposition stating it is of convertible predication. If *risibility* be a property of *man*, then *every man is risible*, and *every one risible is a man*. If *every right line is the shortest between the same terms*, then *every line the shortest between the same terms is a right line*. Thus the propositions are mutually convertible.

¹ Cf. Hoblyn, *Botany*, p. 47.

² Cf. Wallis, *Logica*, v. 21.

§ 249. To speak of property only as that which necessarily follows from the subject or essence of the concept, is to identify the relations of outward objects—observation in general—with those of mathematical conceptions and definitions. To adjust the view of property to the requirements of science, we ought to substitute *uniformity* for *necessity* of sequence. In this case, the logical formula will hold perfectly true. We have essence,—essential properties,—we have others and find others uniformly connected with these. These will be properties whether we can determine a necessary connection or not. The link of evolution is one thing; the fact of the uniform connection is another and the present thing. We may find a certain amount of motion following uniformly a certain amount of heat, and *vice versâ*. We should thus get properties of each, though we know nothing of necessary connection or even of the inner nature of transmutation, beyond superficial quantity of motion and its result. At the same time, this conception of the nature of property was of the deepest insight and widest scope. It was a forecast of all modern science in its true spirit and essence,—the going backwards in analysis to attribute beyond attribute in the object,—to principle beyond principle in things,—on which nearer or observed attributes may be found to depend. In every scientific classification we, consciously or unconsciously, follow this law,—every true scientific mind aims at this end. And to carry the matter wider, all philosophy is in the end but a seeking of that on the properties of which all the attributes of things depend.

We have numerous illustrations in botany of a uniformity of sequence in properties following on a point of difference in classes. To take one instance,—class twelve in the Linnæan arrangement is the *Icosandria*. The character or concept of the class is that of a *plant bearing flowers with twenty or more stamens inserted in the Calyx*. This is distinguished from the class *Polyandria*, which includes plants bearing flowers with numerous stamens, arising from the *Receptacle*. The difference of the two classes is *insertion in the Calyx*, as opposed to *insertion in the Receptacle*. Now with this we have a marked difference of property. The first class contains as species or sub-classes under the Orders, which are in their turn merely subaltern genera and

species, the *Sloe*, *Wild Pear*, *Crabtree*, *Apple*, *Plum*, *Pomegranate*, *Raspberry*, *Strawberry*, &c. These furnish fruits, in most cases, of a pleasant and useful sort. The second class contains in it *ranunculaceous plants*, such as *Larkspur* and *Aconite*, and *papaveraceous plants*, such as the common *Red Poppy*. The properties of the former are described as "acridity, causticity, and poison," and the narcotic property of the poppy is well known.¹ It would be rash to infer that the variation in character of the properties follows or results from the difference, *insertion in Calyx or in Receptacle*. But we have at least here a uniformity or invariable concomitance, which is sufficient so far for scientific and other purposes.

It may be said that the Essence cannot be conceived apart from its property, which is a necessary or uniform sequence. This is quite unfounded and unreasonable. It is perfectly true that we can conceive essence—say, for example, definition of triangle or square—without thinking or even knowing a single property of either, though all may be implied in the definition. Our definition is clear and distinct knowledge. After that we may go on, either by deduction or observation, adding on properties. In this case we should increase our knowledge. But at the same time this very increase requires a sum or datum with which to begin.

§ 250. Property is strictly a mark or attribute which belongs to a class universally taken, and to no other, except that class, and what is contained under it.² Thus *risible* is the property of *man*; *inertia* is the property of *body*.

But property may be taken in a wider sense as indicating the main or constituent marks of a class. *Gravity* is thus a property of *body*; *imponderability* is a property of *ether*; *transformability into molecular motion* is the property of *mechanical motion*. Property in the strictest sense may be regarded as the attribute of a class which is found to follow from, or which may be added by observation and induction to, the concept of the class, or the concept of it as originally framed by us. Given the definitions, for example, of *triangle* or *square*, we thereafter speak of the propositions expressing truths regarding them as embodying their properties—e.g., *any two angles of a triangle are together less than two right angles*.

¹ Hoblyn's *British Plants*, p. 7.

² Cf. Porphyry, *Eisagoge*, iv. § 5; Occam, *Log.*, i. 25.

Given our conception of a particular metal, we may add on, by observation or experiment, attributes or properties not originally known to belong to it.

(a) Property is a concept predicable adequately and convertibly *in quale* (*what sort*), connoting, affirmatively or negatively, something extrinsic to that which is imported by the subject.

Properties are of four kinds—

(1.) That which belongs to one species or one genus, but not necessarily to all contained under each, as *grammarian* to man only, but not to all men. This is the *solī sed non omni* of later logicians.

(2.) That which belongs to every individual of a species, but not to this species alone, as *biped* to man. This is the *omni sed non solī*.

(3.) That which belongs to any class taken universally, but not always, only at a particular time, as *canescere*, to man. This is the *omni et solī sed non semper*.

(4.) That which belongs to some class universally taken, and to no other except that class and what is contained under it, so that it is convertible with it, and necessarily predicable of the same. This is *property* strictly taken; the other three are *accidents*. Thus *risible* is the property of man, *every man is risible, and every risible is man*.—(Occam, *Log.*, i. 25.) This is the *omni solī et semper*.

These distinctions are given in Porphyry, *Disagoge*, v. 1. Cf. Occam, *Log.*, i. 25.

Property and Difference are distinctions dependent mainly on our point of view. In the wide sense, every attribute of a class or concept is a property. The distinction of Difference and Property especially is relative to the aspect of the object presented to us, or represented in the class. Difference may be regarded as a property selected by us to mark off the particular class under the genus.

§ 251. Accident is that attribute or feature which may be conceived as present in or absent from the concept of an object, without destroying in thought the essential features of the object itself as conceived by us. Thus we can think as part of the concept *man*, the marks *laughing, sitting, running, riding*, or the absence of those marks, without in any way affecting the definite concept itself. Accident thus neither constitutes the essence, as difference serves to do, nor follows from it necessarily or uniformly as property does.

Thus the concept of *motion* is not affected, whether we regard the motion as *swift* or *slow*, as *uniform* or *irregular*, as *accelerated* or *retarded*. Nor is that of *water*, as a compound of the two gases, oxygen and hydrogen, changed in any way, whether we find water *cold* or *hot*, *flowing* or *stagnant*. "The

accident," as Porphyry, following Aristotle, puts it, "is that which may or may not be in the same subject."¹

§ 252. Accidents are distinguished as Separable and Inseparable. The Separable is said to be that which can be actually or ideally separated from the subject or concept, while this remains the same, or untouched in its integrity as a concept. Thus we may separate *cold* from *water*, *white* from *wool* or *snow*, *black* or *red* from *coat*, without destruction of the subjects from which we make the separation.

The Inseparable accident is said to be that which is not actually separable from the subject,—as *heat* from *fire*, and, in the old logics, *white* from *swan*, *black* from *crow*. So far as species is concerned, separable and inseparable accidents are utterly unessential. That alone is an accident which is not necessary to the true concept or essence of the subject, and which further is not a necessary or a uniform property of the class or concept.

Accidents may be viewed as Separable and Inseparable in regard to the individual. In this case we have readily what is separable—as of a man *sitting, standing, running, leaping, &c.* As to the Inseparable, we have such things as *native of Paris, of Rome, of London*,—we have *tall, short, crooked, &c.* We have an Ethiopian who is black, and not to be made white by water. These refer wholly to the individual and his peculiarities. If we think of the individual, they are essential to him. The Ethiopian is always unwashable. But the so-called separable accident is not less essential to the individual, if we think of him at the given time when it belongs to him. The man sitting at a particular time can for us as an individual concept only be the man sitting at that particular time. But the concept of essence which the individual embodies remains the same through all such forms of change or accident.

§ 253. Genus, Species, Difference, Property, and Accident are known in Logic as the Five Predicables, or classes of possible predicates—*αἱ πέντε φωναί, quinque voces*. What we say of a subject is supposed to be found under one or other of those heads. What each has in common is that it is predicable of many. This classification is due to Porphyry, as given in the *Eisagoge* to the Categories of Aristotle.²

¹ *Eisagoge*, v. 3.

² See *Eisagoge*, i. § 1 et seq.

(a) In the view of Aristotle there are four Predicable classes, or the Four Differences (*αἱ τέτταρες διαφοραὶ*)—viz., Definition, Genus, Property, Accident. Definition (*ἔπος, ὁρισμός*) expresses the essence or essential qualities of the thing (*τὸ τί ἦν εἶναι*). Hence, in the proposition, the subject may be put for the predicate or the predicate for the subject. *A square is that which has all its sides equal, and all its angles right angles.* This as a definition is convertible.

Genus (*γένος*) is that which is attributed essentially to several objects which differ in species. An essential attribute is that which answers to the question *What is the object?* Thus, *What is man?* The answer is conveyed by the genus *animal*. Here the subject and predicate are not reciprocally convertible. *Animal* is a part of *man*, but it is wider than *man*.

Property (*τὸ ἴδιον*) does not express the essence of the thing; but it belongs to the thing alone, and can be taken reciprocally for it. Thus the property of man is to be able to learn *grammar*: if he is man he can learn grammar, and if he can learn grammar he is man. We should not call that property which might belong to another thing; we should not say that *to sleep* is the property of man. Here there can be no reciprocal attribution or substitution.

Accident (*συμβεβηκός*) is that which may or may not be in one and the same thing. Thus, *to be seated*, may or not be present in one and the same person, and so *whiteness*.

Aristotle did not regard Difference as a kind by itself. Difference, in so far as belonging to the Genus, should be classed with it. It is the limit which separates one genus from another, and can be predicated of several species.—(*Topica*, i. c. 3, 4, 5, 6.) *Ether* may be regarded as an *imponderable fluid with an undulatory motion*. If *undulatory motion* be taken as the difference of ether from say *mechanical motion*, it may yet be regarded as the concept of a species of motion, which is capable of being predicated of other objects besides ether.

It is obvious that the distinctions of difference and property are relative, and are not always capable of accurate grounding.

Of accidents belonging to a class, the inseparable are those which are found in all the members simply as a matter of experience, the separable only in some. An inseparable accident of an individual, such as *native of London*, is predicable of the subject always. What attributes are essential, what are properties, and so on, can at the best be determined only on extra-logical grounds.

§ 254. Notions in Comprehension may be further viewed as in the relations of Involution and Co-ordination. Involution corresponds to Subordination in Extension:—

“One notion is involved in another, when it forms a part of the sum total of characters, which together constitute the comprehension of that other; and two notions are in this quantity (comprehension) co-ordinated, when, whilst neither

comprehends the other, both are immediately comprehended in the same lower concept."¹ The example given is the notion of the individual *Socrates*. This contains, among others, *son of Sophroniscus*, *Athenian*, *Greek*, *European*, *man*, *animal*, *organised being*, &c. Of these, some are given through the others. *Socrates* is *Athenian* only through *son of Sophroniscus*, only *Greek* as *Athenian*, only *European* as *Greek*, only *man* as *European*, only *animal* as *man*, only *organised being* as *animal*. These characters, as given in and through others, stand to those others as parts to wholes; and it is only on the principle that part of the part is part of the whole, that the remoter parts are parts of the primary whole.²

But how, it may be asked, is this relation known? There is no *a priori* connection between *son of Sophroniscus* and *Athenian*. Being *son of Sophroniscus* does not tell me that *Sophroniscus* was an *Athenian*, or being an *Athenian* does not tell me on any logical principle of whole and part that *Athenian* was *Greek*, and so with the others. There is no connection of whole and part here at all, but of one attribute involving another through a mere contingent happening or experience. There is no reasoning here possible on the principle of the *dictum* of Aristotle,—that is, from whole to part. This point will be more fully discussed when we come to treat of Reasoning in Comprehension.

§ 255. "Notions co-ordinated in the whole of Comprehension are, in respect of the discriminating characters, different without any similarity. They are thus, *pro tanto*, absolutely different; and, accordingly, in propriety are called Disparate Notions. On the other hand, notions co-ordinated in the quantity or whole of Extension are, in reference to the objects by them discriminated, different (or diverse); but, as we have seen, they have always a common attribute or attributes in which they are like. Thus they are only relatively different (or diverse); and, in logical language, are properly called Disjunct or Discrete Notions."³

As an illustration of Disparate Notions, we may take *oviparous* and *warm-blooded* as co-ordinate parts of the com-

¹ Hamilton, *Logic*, L. xii., par. 44.

² *Ibid.*, par. 44 et seq.

³ *Ibid.*, par. 45.

prehension of *bird*. These are relative and correlative, but not involved in each other. *Oviparous* is not always *warm-blooded*; and *warm-blooded* is not always *oviparous*.¹

(a) This view of Disparates does not coincide with that of the earlier logicians. Disparates are in extension as well. Thus Disparates are those concepts which are only diverse from each other, and not opposed as contraries, as *earth, vestment, fire*.—(Boethius, *De Syll. Hyp.*, p. 608.)

(b) The difference between Disparate and Opposite Concepts lies in this, that the former are only mutually repugnant, as when one is opposed equally or in the same mode to many, as *man* to *ox, horse, dog, lion*, and other species of *animal*. Opposition arises when one is opposed only to one.—(Cf. Wallis, *Logica*, i. 16; Duncan, *Inst. Log.*, Lect. i., xiv. § 2; Dounam in *Rami Dial.* i., xiv.)

Avarice, as opposed equally to *liberality* and *prodigality*, would be taken as representing Disparates; *parent* and *child*, *good* and *bad*, *seeing* and *non-seeing*, Contraries, (the latter rather contradictories.) But this principle obviously does not hold universally in simple contraries. Of colours, *red* is equally opposed to *green* and *yellow*; of figures, *triangle* to *square* and *circle*. In contradictories alone does the principle hold completely, and in relatives and privatives as these approximate to contradictories.

§ 256. Concepts are, in respect of their Quality, regarded as Clear and Obscure, Distinct and Indistinct. A concept is clear when in our consciousness of it we are able to distinguish it as a whole of attributes, from another or other concepts. It is obscure when we cannot do this. A concept is distinct when we can distinguish from each other the various attributes or marks which make it up. It is indistinct when we cannot do this. Obscurity and indistinctness may arise from defect on the part of the individual thinker. In some cases it arises from the nature of the object thought about. In the case of some mathematical figures, we have both a clear and a distinct knowledge. We can distinguish *triangle* as a whole from *square*, and both from *circle*; and we can further specify the marks by which we are able to do so, and make them distinct to others. We can distinguish buildings of Norman and of Early English architecture from each other, and specify the discriminating marks of each.

But it is quite possible for us to have a clear concept of an object, which is yet indistinct. We can quite well discriminate *red, white, and green* from each other; but it would puzzle us to tell the marks or express them to others.

¹ Hamilton, *Logic*, L. xii.

Shades of the same colour can also be discriminated, but not by specific marks: so with sounds, tones of the voice, and different odours. The mind of average capacity and activity is satisfied with being able to distinguish things as wholes or in a general way; it is only the active, scientific, or philosophical mind which seeks distinct knowledge.

Descartes laid down Clearness and Distinctness as the criterion of true knowledge. "I call that clear which is present and manifest to the mind giving attention to it, just as we are said clearly to see objects when, being present to the eye looking on, they stimulate it with sufficient force, and it is disposed to regard them; but the distinct is that which is so precise and different from all other objects as to comprehend in itself only what is clear."¹

This criterion is, however, ambiguous in its applications. When it is said that whatever we clearly and distinctly conceive is true, we may mean that it is possible, that is, an ideal possibility; or we may mean that it is real, that is, a matter of fact or existence.

Leibnitz much more fully and precisely indicates the various degrees of our conceptual knowledge.² According to him, cognition is obscure, when the object is not distinguished from other objects or the objects around it. Here the object is a mere something, not nothing; but what it precisely is, either in its own class of things, or as contrasted with other things, we do not apprehend. Cognition again is clear when we are able definitely to comprehend the object as in contradistinction from others. Clear Cognition is further divided into Confused and Distinct. It is confused when we are unable to enumerate the marks or characters by which the object is discriminated from other objects, while it yet possesses such marks. Thus we can distinguish colours, odours, taste, from each other, yet we cannot specify the marks by which we do so. At the same time such marks must exist, seeing the objects are resolvable into their respective causes. Our knowledge again is distinct when we can specify the discriminating marks, as the assayers in dealing with gold; and as we can do in the case of number, magnitude, figure. But distinct knowledge may still further be

¹ *Principles*, part 1., § 45, p. 212.

² *De Cognitione Veritate et Ideis*, Erdmann, p. 19.

Inadequate or Adequate. It is inadequate when the discriminating marks are not analysed or resolved into more elementary notions, being sometimes clearly, and sometimes confusedly, thought,—as, for example, the weight and colour of gold. Knowledge, again, is adequate when the marks in our distinct cognition are themselves distinctly thought, that is, carried back by our analysis to an end or termination. Whether any perfect example of this exists is, in the view of Leibnitz, doubtful. Number is the nearest approach to it. Then there is the distinction of the Blind or Symbolical and the Intuitive in cognition, the former being the potentiality of conception which lies in terms; the latter being the clear and distinct or individual picture of each mark so lying undeveloped. When cognition is at once Adequate and Intuitive, it is Perfect. But Leibnitz hesitates to say whether such can be actually realised by us. Adequate knowledge involves cognition through means of *a priori* possibility. But “whether such a perfect analysis of notions can ever be accomplished by man—whether he can lead back his thought to first possibles (*prima possibilia*) and irresolvable notions, or, what comes to the same thing, to the absolute attributes of God themselves—viz., the first causes, I do not now dare to determine.”¹

¹ *De Cog., &c.*, Erdmann, p. 80.

CHAPTER XVII.

CONCEPTS: THEIR EVOLUTION—DEFINITION AND DIVISION.

§ 257. Seeing that terms are liable to be used without any knowledge of their meaning, and in an indeterminate or uncertain sense, we require Explication and Determination. These processes come under the head of Definition in its stricter and wider senses.

When we specify precisely the sense in which a term is employed, or is intended to be employed by us, we have Definition of the Name—Nominal Definition. When we specify the nature or essential attributes of the thing or object to which the name is applied, we have what is called Real Definition—Definition of the Nature of the Thing. But Real Definition, or definition of the nature of the thing, ought not to be distinguished from Definition proper—that is, Logical Definition; for it is the nature of the thing as conceived by us, or our concept of the thing, which we actually seek to define. The process of constituting the concept is supposed to be already completed; and our definition is an unfolding of what we hold mentally about the object. Real Definition has, however, a reference to the fact or class of objects as existing; and it points to the truth or correspondence of the concept with the universal properties of the class. But in Logic this is supposed to be given or known, ere we can explicate it for the purposes of clear thinking by means of strictly logical definition.

§ 258. In the definition of a term or name—Nominal Definition—we usually employ other terms better known, either a series of explanatory words instead of one, or a synonymous term. This is illustrated in the explanations of the diction-

ary. One great aid in the matter is Etymology, though it is not always to be relied on as giving us the present or actual sense of a term.

(a) It happens in Geometry, and is so far allowable, that we assign to a term a specific meaning, even although this is not the one in ordinary use, or even although it differs from the application of the same term by others in the same general department, provided that the assigned meaning be rigidly adhered to. Thus Euclid's definitions of *triangle* and *conc* apply, the one to *plane rectilineal*, the other to *right or erect conc*, while with Theodosius *triangle* is so defined as to take in *spherical triangle*; and with Apollonius *cone* is so defined as to embrace *scalene*.¹

§ 259. Besides Nominal and Real Definition, we have what is called *Genetic Definition*. This applies only to quantities in time and space. In Mathematics, Genetic Definition is called Real, as opposed to Nominal. Thus, we have an example, when we say:—"A circle is formed when we draw around, and always at the same distance from, a fixed point, a movable point which leaves its trace, until the termination of the movement coincides with the commencement."² This is obviously merely a rule for embodying in a concrete form a definition already existing in the mind. Every time I image to myself *triangle* or *square*, I may be said to define genetically. But this is no proper application of the term. Nor can it be correctly said that the notion is the result of the definition; the concrete image is, but not the notion. Nor is there anything properly synthetic in the process; it simply embodies what we already think.

§ 260. Definition unfolds the Comprehension of a concept; Division exhibits the Extension. The Comprehension and the Extension of a concept ground and render possible the processes known as Definition and Division. A concept being supposed to be constituted through the processes proper to its construction, it may possess an attribute or mark which is essential to it in the sense of being universally in it; and which is at the same time in another concept higher and wider in the scale of generalisation (genus)—as *animal* in *man*,—*sentient* in *animal*. It may also possess an attribute which does not belong to the higher or wider concept, and

¹ Cf. Wallis, *Logica*, l. 23.

² Wolf in Hamilton, *Logic*, L. xxiv.

which yet is not possessed by other concepts co-ordinate with it under the higher notion (difference) as *rational* or *responsible* in man.

Both those attributes, however, may be essential to the concept, that is, such that if they were taken away it would no longer be the concept it is, while there are other attributes which might be abstracted without this happening,—as *white* from *man*, *biped* from *animal*. When thus the genus and the difference of a concept are declared in a proposition, we have Logical Definition. It is essentially an analytic process; it unfolds or declares what we hold to a certain extent implicitly in thought. It thus makes a notion as a sum of attributes, essential and characteristic, clear. Thus I say,—*man is a rational animal; magnet is an iron-ore, having attraction for iron; physics is the science of inert matter; mechanical motion is the transport of a body from one point in space to another; molecular motion is the change in the internal particles of a body, continuing as a whole to occupy relatively the same space.*

§ 261. The process which seeks to unfold the essential attributes or comprehension of a concept is called Definition—Logical Definition; that which aims at unfolding or enumerating the classes or species under the genus, is called Division—Logical Division. So far as our knowledge is concerned, Definition aims at clearness, and Division at distinctness. Our knowledge is said to be clear, when we distinguish one concept from another; distinct, through division, when we distinguish the sub-classes or species under a genus. In another relation, our knowledge is distinct, when we are able to mark off the attributes in a concept from each other, and so distinguish the concept from others.

§ 262. Definition and Division, as formal or purely logical processes, are very limited in their application. All that definition, logically considered, can tell me is, that every definition is possible in which the attributes combined are non-contradictory, either directly or indirectly. No logical law can assure me that the given definition corresponds to an object in reality, or is adequate to that object. This it is for observation and generalisation to do.

§ 263. In the same way Division cannot, as a purely logical process, unfold the extension of a concept. We may divide every concept contradictorily, that is, by dichotomy. We

can divide *figure* into *rectilinear* and what is not *rectilinear* say *curvilinear*. But we cannot do even this much by pure or logical thought. The one difference or attribute of *figure* must be given us, ere we can take a step. Then we can make the division, and say these are opposite classes; the one is not the other. The logical laws, further, do not assure us that the difference is the real difference, or such as is proper and adequate to the class of things as existing in nature.

§ 264. At the same time, the logical laws acting along with actual observation and thinking, regulate it, keep it within due bounds, aid it in its operations, help to clarify, distinguish, and classify. They are not the motive power at work in the world of science, but they are the ruling and governing power. They not only ground the possibility of our actual thinking, but they help it on the way to its highest virtues of clearness, distinctness, connectedness.

(a) Aristotle, in treating of Definition (*ὁρισμός*), regards it in the first place and mainly from the side of the real. His question is principally how we are to reach a good, adequate, and true definition of the thing or real object. Definition is with him the expression of the essential qualities of a thing or of its specific nature. It answers to the question *τί ἐστὶ*; hence the definition is sometimes called *τὸ τί ἐστὶ*.—(*An. Post.*, ii. *passim*.) From this point of view, accordingly, definitions will first of all represent the most general classes or principles, the necessary and universal concepts, which are the means and the principles of demonstration. They are such as are fitted to explain or include all particulars or facts. These universal conceptions are indemonstrable, yet they are got by observation and induction.—(*Cf. An. Post.*, ii. §§ 1 to 8.)

The definitions of the most general sort are called by Aristotle *immediate* (*ἔμμεσα*). All others are named *mediate* (*μέσσω ἔχοντα*), and express secondary qualities and properties, that is, those not constitutive of the most general essences of things. The principle of demonstration is an immediate proposition. That is immediate which has nothing prior to it. These are both forms of what was afterwards known as *Real Definition*, definition of things. Definition explains what a thing is and the substance of the thing (*τοῦ τί ἐστὶ καὶ οὐσίας*—and *ὁ ὁρισμὸς οὐσίας τις γνωριμὸς*).—(*An. Post.*, ii. 3.)

But Aristotle farther distinguishes definitions into two classes. He who defines declares either what a thing is or what the name signifies (*ὁ ὁρίζμενος δείκνυσιν ἢ τί ἐστὶν ἢ τί σημαίνει τοῦνομα*).—(*An. Post.*, ii. 7, cf. 9.) Those who confine themselves to the explanation of the name alone do not give a definition of the thing.—(*Top.*, i. 5.) This kind of definition, corresponding to the later *Nominal Definition*, Aristotle also calls *λόγος ὀνοματώδης*.—(*Ibid.*, 8, 9, 10.) The former, or *Real Defini-*

tion, has been called *ὑποπραγματώδης, οὐσιώδης* (*essentialis*). To this it should be added that Aristotle regards that definition as alone of importance which unites the knowledge of the cause or origin of a thing with that of the essence. These are not in truth really separable. In knowing what a thing essentially is, we do this only through knowing how it is or has arisen. And that alone which is real has essence.—(Cf. Alexander Aphrodisienis, Pacius, Waitz, Franck, in *An. Post.*, *loc. cit.* See also Ueberweg, *Logic*, 168.)

Aristotle's ultimate appeal in order to get the definition of the real is observation and generalisation. What is magnanimity, he asks? And how am I to know this? Only by reference to individual instances. I must observe Achilles, Ajax, Alcibiades. What they have in common is the quality of not tolerating an injury. But I may look further. I find Socrates and Lysander. In them I find an indifference equally to good and to bad fortune. If I find a resembling feature in those two qualities, I group them as one; if not, I leave them separate. Observation of the individual thus precedes classification or the formation of the essence.

(b) Leibnitz's view of Real Definition is that of an enumeration of the marks which render the object possible; of Nominal Definition that of the marks which enable us to distinguish it from other objects. The Real Definition would thus proceed on the ground of the non-contradictory character of the marks, and of certain real or assumed causes, as possibly operating in the phenomenal sphere. Nothing is possible that is contradictory, and further nothing is possible that is beyond the range of existing causes, whether known or unknown. But this latter test is quite too vague to be of any help. The former, or non-contradictory test, is definite enough.

(c) Mill makes a strange medley of the whole subject of Definition.

(1.) He broadly lays down the doctrine, that the relation expressed by propositions is between two matters of fact, not between two names.

(2.) He holds that all Definitions strictly refer to names and not to things.

(3.) He holds at the same time that Definitions, though only of names, are to be founded on a knowledge of the things indicated by the names.¹

In the first place, as a Definition is a proposition it can refer only to matters of fact, not to names. In the second place, if there be a knowledge of things grounding the application of the names, and if definition refers only to names, then our knowledge of things must be apart from definition or wholly indefinite, and, therefore, useless.

§ 265. Logical Definition, in its strictest and best form, consists of the Proximate Genus, and the Proximate Constitutive Difference, of the Species which is to be defined. The proximate genus ought to be given in the interest of the greatest precision in the ascending scale; the proximate

¹ *Logic*, i. 160 *et seq.*; ii. 216 *et seq.* Cf. Ueberweg, *Logic*, p. 171, *note*.

difference ought to be given in the interest of the most precise discrimination of the species from other species co-ordinate with it under the common genus.

(a) Every predicate of a thing is either a convertible or non-convertible attribute. If the attribute is convertible with the subject, the attribute is either a definition or a property,—definition if it expresses the essence of the thing, property if it does not. If the attribute makes part of the attributes comprised in the definition, it is either genus or difference of the subject, since definition is always composed of genus and difference.—(*Top*, i. 8.)

(b) Definition as applied to the lowest species or to the individual may take any essential or constitutive property, that is, attribute convertible with the subject. Thus we may define *man* as a *risible animal*; *horse* as a *neighing animal*.

§ 266. To illustrate this point, Definition, logical definition, implies two things, first, the statement of the class, or proximate genus to which an object belongs; and secondly, the distinguishing feature or character by which it is marked off from other objects of the same class—e.g., the *Magnet* or *Loadstone* would be defined, *an iron-ore having attraction for iron*. Here *iron-ore* is the class or genus to which magnet belongs,—it is also the proximate class or genus,—for it is that under which it immediately stands, there being no intermediate class between *magnet* and *iron-ore*. *Having attraction for iron* is the distinguishing feature of magnet, its *differentia*, because this is the feature which marks it off from other kinds of iron-ore. In the same way we define the notion of *responsibility* by the notions of *free intelligence*. Responsibility, that is, involves *intelligence* as its genus or class, it involves also *freedom*; for a will to be responsible must not only be illumined by knowledge, but free to choose between alternatives.

Thus we may define *triangle* as a *surface contained or bounded by three straight lines*. Here *surface* or *superficial figure* is the proximate genus; *figure* is the more remote. But *surface* is more precise, as excluding *depth*. *Surface*, however, takes in *circle*, *square*, *parallelogram*, &c. *Triangle* is not all *surface*; it is only that which is *terminated by three lines* (difference), and by *three right lines* (proximate difference).

§ 267. Definition is thus seen to be a powerful means of rendering our thoughts clear, of enabling us precisely to know what we mean in the use of words. (1.) The

first main caution or rule about Definition is that the defining clause should not be wider or narrower than the subject defined, as Aristotle puts it, οὐτε πλεῖον πρόσκειται, οὐτε ἀπολείπει οὐδέν.¹ A Definition to be accurate and adequate, i.e., to be a correct definition, must thus be a convertible proposition. Or, the defining clause must be capable of being put exactly in the place of the thing defined, and of nothing else. Thus if the definition of Magnet be correct, we must be able to say, *an iron-ore having attraction for iron is a Magnet*. Or, *common salt is chloride of sodium*. If this be a correct definition, then it is true that *chloride of sodium is common salt*. Suppose we were to define *literature as composition in words*, we might test this definition by wheeling it round, and saying, *all composition in words is literature*. In this case we should at once see the inadequacy of the definition, for we should hardly include under literature a testamentary document or an Act of Parliament, or a newspaper advertisement, or the local correspondent's paragraph, though these are all composition in words. So if we were to say, *a bird is a creature that flies in the air*, we should take in too much, for so do butterflies and midges. The test or rule, therefore, of a sound logical definition is, that the thing defined and the defining clause are mutually convertible. This is a most useful practical test in all matters requiring accuracy and precision of thought. The defining proposition is a *propositio integra*; or, as Aristotle long ago put it, a definition is a simply or strictly convertible proposition.

§ 268. (2.) We should not seek to define through negative or merely disjunctive attributes. In this case we do not unfold what we know or conceive, but what we do not. When we say of a (supposed) concept or object that it is not so and so, we do not tell what it is, or what the term positively stands for in our thought. In the same way, if we say the object I speak of is either this or that or the other, we fail equally in defining. There is no proper definition which does not specify positive attribute. The negative expression may, however, be useful in clearing the way for a definite or positive statement.

This caution about negative terms applies fully to a concept taken by itself; but if we consider a concept in relation

¹ *An. Post.*, ii. 13.

to another which we already know, and whose attributes we specify, we may explain, even classify, if not define, by negation.¹ Thus we can give knowledge and classify scientifically *organised* and *non-organised*, *vertebrate* and *invertebrate*, *phanerogamic* and *cryptogamic*, that is, *flowering* and *flowerless plants*, *rectilinear* and *not-rectilinear*. So in regard to the terms *finite* and *infinite*, or *non-finite*; here knowing what the finite is, or at least knowing certain positive attributes of it, we can in a way, or negatively, know what that is which is conceived as devoid of those attributes. So with *personal* and *impersonal*, *relative* and *absolute*.

§ 269. (3.) There should be no circle in the proposed Definition, or what is contained in the clause defined should not be repeated in the clause defining. As the one clause is thus defined through the other, we have what is called *Diallelon* (δι' ἀλλήλων), or "circulus in definiendo." Thus to say that *law* is a *lawful command*, or that *plant* is an *organised being possessing vegetable life*, or *life* is a *vitalising power*, is to define in a circle. There is here no explication of the subject defined. "Concealed circular definitions are of very frequent occurrence when they are at the same time mediate or remote; for we are very apt to allow ourselves to be deceived by the difference of expression, and fancy that we have declared a notion when we have only changed the language."²

§ 270. Other rules that the definition should be precise in terms, perspicuous and direct, that is, not ambiguous, figurative, or metaphorical, are cautions mainly regarding the use of words, in so far as this may aid or hinder us in attaining clearness. The readiness with which people are impressed by figurative and metaphorical words, when the object requires direct and unambiguous thinking, is a proof of how far the average culture of intelligence is, in our so-called civilisation, below the normal standard.

§ 271. Description is usually made up of what are known as *Common Accidents*, that is, attributes which distinguish the object or species from others that come under the same general class. It is in fact a characterisation of the object, through comprehension, or specifying its marks. Description refers chiefly to the characteristics of individuals, as each the sum of its own marks. The laws of Description fall to be

¹ Cf. Hamilton, *Logic*, L. xxiv.

² *Ibid.*

treated of under the Science of Literary Criticism, or Rhetoric. It will be found, however, as a general rule, that the best masters of description in verse or prose, follow consciously or unconsciously certain very definite rules, which are quite capable of being specified. First among these is the principle of general picturing or outline, and then the gradual filling in of characteristic features with a view to the unity of real presence. Even the most picturesque description never loses sight of, far less violates, those definite laws of imaginative construction. Take Scott's ballad of *Rosabelle*, follow it, note the commencement, and watch the gradual evolution of the picture, and this will be found to be true:—

“O'er Roslin all that dreary night,
A wondrous blaze was seen to gleam;
’Twas broader than the watch-fire’s light,
And redder than the bright moonbeam.

It glared on Roslin’s castled rock,
It ruddied all the copse-wood glen;
’Twas seen from Dryden’s groves of oak,
And seen from caverned Hawthornden.

Seemed all on fire that chapel proud,
Where Roslin’s chiefs unconfined lie,
Each Baron, for a sable shroud,
Sheathed in his iron panoply.

Seemed all on fire within, around,
Deep sacristy and altar’s pale;
Shone every pillar, foliage-bound,
And glimmered all the dead men’s mail.”

§ 272. The limit of Definition is met with at the simple idea, that is, a concept which does not contain a plurality of attributes, as *time*, *extension*, *being*. Here there is no higher genus.

At the same time we must not suppose that such notions are not distinguishable from other notions. But in order to this they must be given in intuition. This readily founds a judgment of Difference, though the grounds of it are not always expressible in terms. Logic carries us to the threshold of the real, but is there arrested.

No form of words in which oral Definition or even Description can be couched is adequate to all the objects of the senses. The intuition or presentation of the quality is here

indispensable, and it is the mode of conveying the clearest and most distinct knowledge; *omnis intuitiva notitia est definitio*. We are thus enabled actually to experience the perception or sensation. This holds of colours, as *red, blue, yellow*; of *light, brightness, and darkness*; of *tastes, odours, sounds, &c.*—indeed of nearly every sensation and percept.

§ 273. All Division supposes a whole of some sort, and we must distinguish simple Partition (*ἀπλῆθις*), real or ideal, from Division Proper (*διαιρέσις*). In the former case we sunder the whole, generally individual, into its constituent parts, as when we divide *a tree* into *root, trunk, branch, leaf*, or such elements as make up the whole. We may do this really or ideally only.

Logical Division, on the other hand, deals only with a universal, that is, where there is a plurality of objects or classes contained under the concept. And it draws out or specifies the classes thus contained. The *tree*, logically divided, would give, say, *deciduous* and *non-deciduous*, and these again *oak* and *pine*. In the case of simple partition, the name of the whole is not predicable of each of the parts. *Tree* is not predicable of *root*, or *trunk*, &c. In the case of logical division, it is so predicable. *Tree* is predicable of *deciduous* and *non-deciduous*, of *pine* and *oak*.

§ 274. As Definition refers to the comprehension of a notion, and serves to make the meaning clear, so Division refers to the extension of a notion, and serves to make our meaning distinct. A notion is clear when I can distinguish it as a whole from other notions; a notion is distinct when I can enumerate or specify the sub-notions or classes contained under it. Division draws out these.

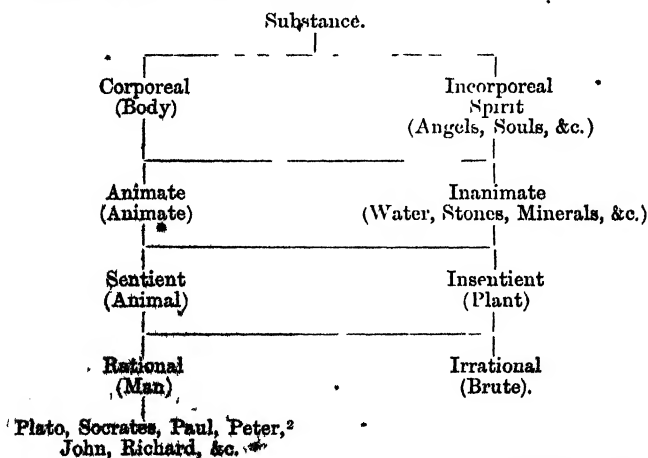
§ 275. In Division you will find that we come to a point or object which cannot be further divided. This is the *individual* (*ἄτομος, individuum*)—i.e., literally what is indivisible, or that notion or name which can be predicated only of one subject, not of a plurality. The individual cannot be logically divided, because it contains no species under it. *Glasgow* cannot be logically divided, for it contains no lesser *Glasgows*, no classes under it. This or that house cannot be divided, for it is one, logically one. It is only the universal which you can divide. You may enumerate the parts physical or other of which this city is composed, the parts of which this tree

is composed; you may describe each, but you cannot logically divide either.

§ 276. Logical division cannot proceed until a principle of division is selected from the whole. This may be either one of the constitutive features of the concept, or it may be the relation of the concept to some end or aim which we select or have in view. The law of Logical Division is strictly that of Non-contradiction. Starting from a given attribute, we divide into the classes under it, through its opposite or contradictory. Thus, taking animate, we fix on *sentient*, and divide into the *sentient* and the *non-sentient*. What are the *non-sentient* under the genus, or whether they actually are at all, is to be determined, not by the logical law, but by experience. Still, the ground of exclusion lies there in the element of opposition or contradiction; and but for this no progress were possible. "Contradictio est mensura omnis oppositionis."¹

We may divide *plants* into *flowering* (*Phanerogamic*) and *non-flowering* (*Cryptogamic*). The latter we may again subdivide, according to subordinate differences, into *ferns*, *mosses*, *lichens*, *fungi*, *algæ*, &c. But what these are, or how many, is not determinable by any law of pure thinking.

Take what is known as Porphyry's tree:—



¹ Duncan, *Inst. Log.*, L. i., xiii. 4.

² *Eisagoge*, ii. 23.

Again, *heather* is of the genus *flowering plant*, and under *Octandria*—i.e., it is a *plant bearing flowers with eight stamens, and, under this class, with one pistil*. Under this genus (*Mono-gynia*), it is but a co-ordinate species. As a genus, *Erica*, it has certain marks,—*calyx inferior, four-parted, persistent, corolla monopetalous, &c.* Under this we have various differences, which mark out the species,—as *anthers with two simple bristles at the base, &c.* This gives the *cross-leaved heath* (*Erica tetralix*). *Anthers with two serrated appendages at base, &c.*, gives the *fine-leaved heath* (*Erica cinerea*); and finally, through difference of *leaf* and *capsule*, we have the common heather (*Erica vulgaris, Calluna vulgaris*).

§ 277. In a concept, this or that feature may be fixed on for the principle of Division. Taking the *corolla* of a plant, and looking to the *tube*, it may be *long* or *short*, as in *primrose, bell-flower*. The *throat* may be *open* or *closed*, as in *digitalis, snap-dragon*. The *limb* may be *erect* or *spreading*, as in *hound's-tongue, primrose*.¹ Book I may divide according to its *subject*, its *size*, its *antiquity*. All are equally valid divisions, provided I preserve the feature or principle from which I start. Of course no principle of Division is of any real use which is not a constitutive attribute of the whole.

§ 278. The rules of Division are specially as follow:—

- (1.) There ought to be a regulative principle in the Division. (*Divisio ne careat fundamento*.)
- (2.) There should be but one principle in one Division.
- (3.) The principle should be an actual and constitutive attribute of the whole to be divided.
- (4.) No predicate in the division must, *per se*, exhaust the subject.
- (5.) The dividing members must together exhaust, and only exhaust, the subject.
- (6.) The divisive members must be mutually exclusive, that is, there must be no cross-division.
- (7.) There should be no leap in the division, but a descent from immediately higher to immediately lower classes.²

Thus, for example, to illustrate the main rules, take the notion *figure*. I wish to enumerate its species. To do

¹ Cf. Hoblyn, *Botany*, p. 43.

² Cf. Hamilton, *Logic*, L. xxiv.

this, I must find a principle of Division. Here the natural principle is *straight or curved line*. Taking this, I first divide *figure* into *rectilinear* and *curvilinear*, i.e., straight-lined figure and curved-line figure. But I have not yet made my notion distinct enough. What are the sub-classes under *rectilinear figure*? According to the number of sides—*triangle* and *square*. Under *curvilinear figure*, I draw out *circle* and *ellipse*. My division of *figure* is now distinct. I know what object or classes of objects it denotes or contains in its extension. And observe that this division proceeds in a regular order from the widest notion to the narrower ones, from the *Genus Summum* or highest class to the *Species*. *Figure* is widest or highest notion; *rectilinear* and *curvilinear* is the next, narrower; *triangle* or *square* still narrower than *rectilinear*; *circle* or *ellipse* narrower than *curvilinear*. This is an important principle in Division, viz., that of preserving due subordination, making no leaps in the Division over intermediate classes. If I had divided *figure* into *triangle* and *circle*, I should have made a bad division, for I should have omitted the intermediate classes.

§ 279. One most important thing in Logical Division is to have a principle of Division, and to keep by it. Otherwise the whole division will get into confusion. Suppose, for example, I were to divide the notion *man* or *mankind* into *Englishmen*, *Frenchmen*, *Scotsmen*, *Episcopalians*, *Roman Catholics*, *Presbyterians*. This would be a bad division; for the members of the division are not exclusive of each other. An Englishman may be an Episcopalian, a Frenchman may be a Roman Catholic, and a Scotsman may be a Presbyterian.

To avoid this, we must keep by one principle of Division; state it distinctly. We may divide *book* according to its *subject*,—*historical*, *philosophical*, *scientific*,—according to its *language*,—*French*, *English*, *Latin*, *Greek*,—and so on. But we must not mix up those principles of Division; for the parts of the division as inclusive, would be inconsistent with the nature and process of division itself. This fault is what in Logic is called a Cross Division.

PART III.

OF JUDGMENT.

CHAPTER XVIII.

THE NATURE OF JUDGMENT—COMPREHENSIVE AND EXTENSIVE.

§ 280. Every act of consciousness is a judgment, or judgment is involved in every mental act. As I am conscious, I am conscious of some thing or object—some definite thing, and this I distinguish from another act of consciousness which had for object something different from the present. There is here affirmation, and there is negation. Consciousness is thus primarily a judgment or affirmation of existence,—that some thing is. This form of judgment, the existential, is prior to the judgment which is a form of comparison. Through the latter process, based on the former, we grasp resemblances in several things, and group them into classes. We may then compare the classes, or the concepts of the classes, *i.e.*, the attribute or sum of attributes which make up each concept, and judge them to agree or not, to be technically congruent or conflictive. We may compare the individual as a presentation with the concept, and include or exclude it as a member or not of the class. This would be logical judgment. Here we look, in the first place, merely to the congruence of attributes; or we look, in the second place, to the relative coincidences of objects as members of

the class. We may say—*This thing I see is now and here. I feel cold.* These are existential judgments, and have a reference to a definite time and definite reality. I might say, *the river runs, man is organised, and the three angles of a triangle are equal to two right angles.* These are logical judgments. I do not require the actual existence of the objects, or imply them. I merely state a congruence or coincidence between two concepts, or a concept and its property.

(a) This distinction was foreshadowed in the *enunciatio apprehensiva et judicativa* of Scotus and Occam. The former referred to the apprehension of the relations, say of likeness or equality among sensible or immediately perceived objects; the latter, to notions compared by the intellect. The existential judgment is clearly recognised by Biel, *Sup. Sent.* q. 1. *Prol.*

(b) Mill is pleased to say that to hold both those forms of judgment—the existential and the logical—is “the very crown of the self-contradictions which we have found to be sown so thickly in Sir W. Hamilton’s speculations.” The crown here of the sown contradictions is evidently a vegetable product. But how the self-destroying contradictions have had vitality to grow even a crown, we are not told. The existential judgment is, it appears, not a comparison of concepts or of an individual and a concept. The self-contradiction only emerges as a spectral illusion, because Mill will insist that Hamilton, in his *Logic*, is not speaking of the character of logical judgment, of which he is there bound to speak. Besides, Hamilton would probably have told Mill that, in the existential judgment—*this is here, that is there, I am conscious of heat or cold*—we do compare and contrast an individual and a concept, though we at the same time in such an act go beyond this, and relate them to a given time and space. He would probably have added that, while we do not get the judgment *I am conscious*, from a comparison of concepts, self and being, the consciousness of these is there all the same; and that the logical judgment is reflectively reached in the moment in which the real judgment is given. They are in fact implicative; and were there any logical confliction in the concepts, self and being, there could be no real judgment or union of them. So far, then, from its being a crowning contradiction to hold the two together, it would be a crowning absurdity not to hold them together. Logical judgment is secondary and reflective; it presupposes the consciousness in the existential judgment of the special forms of existence, afterwards to be reflectively realised as categories, and even of features to be generalised into classes of objects.

§ 281. It is clear from this that judgment, that is, logical judgment, in no way implies belief in the reality or existence of the subject and predicate as facts of experience, or in the truth of the relation of congruence or confliction expressed in the judgment. We are here dealing with judgment simply

as judgment, or with what is essential to it as an abstract act, or in its abstract possibility. Its conditions are congruence or confiction of subject and predicate, viewed in comprehension. Judgment thus considered obviously does not involve belief at all in the reality corresponding to the judgment. We cannot disbelieve, unless we have a judgment before us; but we may have a judgment before us, and neither believe nor disbelieve in the truth of it as a statement of experience. That the notion of *man* agrees with the notion of *organised*, or that *man* is *organised*, I can quite well assert, without believing or disbelieving that there are men in the world at all. That *equilateral* is *equiangular*, I can quite well assert, though I know no objects of experience corresponding to the one or the other. So I can say that *lying* is *dishonourable*, though I may know no one who is telling a lie in the world at the present moment. That the Dodo is so and so characterised, I can assert, though I suspend my belief as to whether the species is extinct or not. As Occam said: I may know that a stone is not an ass, though I do not know that there is either stone or ass at this moment in the world.

(a) Mill challenges Hamilton's definition of judgment, on the ground that Belief, meaning belief in the objective reality of the judgment or thing judged of, is essential to a judgment. "The recognition of it [the judgment] as true is not only an essential part, but the essential element of it as a judgment; leave that out, and there remains a mere play of thought in which no judgment is passed. Every judgment consists in judging something to be true. The very meaning of a judgment is, something which is capable of being believed or disbelieved; which can be true or false; to which it is possible to say *yes* or *no*."—(*Examination*, p. 348.) What has been already said disposes of any point in this criticism; but it may be added that truth is here ambiguously, or rather abusively, used for truth of fact. But there is truth of consistency as well, and this is, in the first place, simply in our concepts and judgments; and unless this be as a condition, all our judgments about matters of fact are futile, not judgments at all. Further, "the recognition of the judgment as true" can hardly be essential to it, if there be false judgments, as there happen to be; and if also, as Mill tells us, a judgment is that which is capable of being true or false. If a judgment is capable of this, it must be capable of being regarded as a judgment, ere we either believe or disbelieve it. It is nothing to Mill that in this criticism of Hamilton he flatly contradicts his own theory of belief as given in his *Logic*.—(See i. p. 96, 8th edition.) Belief in the reality of the things judged is not essential to judgment, if it be simply possible as it is to form an ideal combination of terms. *The centaur is an animal with the body of a horse and the head of a man.*

Does any one imagine that if we do not believe in centaurs, that this statement is therefore not a judgment?

(b) Mill objects and asks: "Do we never judge or assert anything but our mere notions of things? Do we not make judgments and assert propositions respecting actual things?"—(*Examination*, p. 346.) In turn, I ask do we judge or assert anything about things, which we do not know, or of which we have no notions? What are actual things for us but the things as known and conceived by us? How can we assert anything about an actual thing, unless we have a notion of the thing and of that which we assert of it? And does not this judging through our conception of things yield the variety in our judgment of things? Would it not be a wonderful faculty of judging which could determine about actual things, not known or conceived by us? This would be getting at things in themselves with a wonderful leap; only what we overleap is our knowledge of them. But if we cannot compare the naked actual things, what about them can we compare except our notions, or symbols of the things? Does Mill contend that we compare words *minus* notions or meaning, or what?

§ 282. In a Judgment there is obviously a plurality of thoughts and terms. But as Aristotle long ago pointed out, there is not necessarily any judgment in such a bare plurality. We may think of *whiteness* and *wall* in succession; of *a*, *b*, and *c*; but unless we join them through a definite relation of *is* or *is not*, we have no judgment. Nay, Aristotle goes further. We may even have sentences, in which words are joined together, which are yet not properly judgments. "I deprecate," "I wish," "I pray;" in each case I express myself in a sentence, but I do not properly judge. I do not definitely assert or deny one thing or another. As Albertus Magnus puts it: "*Nec deprecativa nec optativa, nec infinitiva cum vero vel falso significant, sed quando est indicativa. . . Oratio perfecta dividitur. Non enim omnis oratio enuntiatio est, sed illa sola in qua indicative est significatum.*"¹ Wish and prayer, threat and command, may indicate convictions on the part of the person using them; but these are implicit. There is as yet no form of judgment as to the matter of them. All the judgment that even approaches explicitness is the assertion of the act or state of consciousness in which they are realised.

(a) The first enunciation, in as far as it makes one expression, is, according to Aristotle, affirmation, then negation. Affirmation (*κατάφασις*) is the enunciation of one thing of another thing. Negation (*ἀπόφασις*) is the enunciation of one thing disjoined from another thing. In other words, affirmation is that which relates one thing to another, negation

¹ *Periherm.*, ii. 2, p. 243 A, and i. p. 258 A. Cf. Prantl, iii. p. 104.

that which disjoins one thing from another—(*De Int.*, v. vi.) Reference and removal are obviously at the root of the Aristotelic conception here, and very naturally. These are spatial relations, transferred to the mental act.

(b) Both affirmation and negation belong essentially to the nature of the act of enunciation. The negative particle is an expression of the characteristic difference of the mental act of negation, not a mere accident of expression; and the negation belongs essentially to the copula, not to the predicate. Affirmation and negation indicate the *quality* of the enunciation or judgment.

(c) For λόγος ἀποφαντικός, ἀπόφανσις we have *oratio enunciativa*, *enunciatio* (Boethius); *oratio indicativa* (Petrus Hispanus); *effatum* (Sergius); *proloquium* (Varro); *enunciatum* (Cicero); *propositio*.

Ἀπόφανσις and πρότασις are, according to the usage of Aristotle, to be distinguished. The former is the general word; when used as the premiss of a syllogism, it is called πρότασις, proposition. To propose, προτείνειν, is to lay down the propositions of a syllogism.

(d) Verbs by themselves are simply nouns. They do not signify whether a thing is or is not. Neither "to be" nor "not to be" is a sign of a thing; nor is "being," for that is nothing. They signify a certain composition, which is unintelligible apart from the constituent members. Hegel's dictum "Being is nothing," is thus anticipated by Aristotle, but in a very different sense. Being (τὸ εἶναι) is nothing according to Aristotle, unless as a connective of one thing with another.—(Waitz, in *De Int.*, c. iii. l.)

§ 283. In a judgment there is, first of all, to be considered the precise nature of the copula, *is* or *is not*. This may mean (1.) that the subject contains in it an attribute, as *the sun shines, man is responsible, birds fly*.

(2.) That the subject belongs to a class of which it forms a part, as *some men are European, plant is organised, a good orator is impressive, the cow is ruminant*.

In the former case the judgment is in Comprehension. The subject contains in it the attribute specified at least. In the latter case, the judgment is in Extension. The subject is contained under the predicate as a part at least; other things may be also contained. This class or object is at least a portion of a possibly wider class of objects. This relation of subject and predicate is sometimes expressed as that the subject is the containing whole (in comprehension), and that the predicate is the containing whole (in extension), under which the subject is a part.¹

(3.) The copula may indicate an exact equivalence between subject and predicate,—as *Homer was the author of the Iliad*.

¹ Cf. Hamilton, *Logic*, L. xiii.

Newton was the author of the Principia. All equilateral is all equiangular. All the planets are some stars. Some stars are all the planets. In this case we have Equivalent or Substitutive propositions.

§ 284. Hamilton holds that the comprehensive proposition is the first or primary form, and that this proposition always implies a corresponding proposition in extension. He does not maintain that these two kinds of propositions can be separated, and set apart absolutely, whether in thought or in fact. But he holds that they are two modes of looking at the same matter, that every proposition may be expressed in the one way and in the other, and that we do actually judge sometimes in the one way and sometimes the other. When, for example, we say, *man is two-legged*, we may mean that the notion *man* contains as one of its characters the attribute *two-legged*. This is a judgment in comprehension. Obviously, the comprehensive proposition implies an extensive proposition; for if the subject-notion be an individual and have an attribute, this attribute is the property of at least one individual, and ideally of a whole possible class, and if the subject-notion be a class (or plurality of objects), extension is equally implied. Conversely, the extensive proposition implies a comprehensive, for we cannot have a class or plurality of objects grouped together unless on the ground of a common attribute. Otherwise we should fall into the arbitrary and meaningless.

§ 285. In the ordinary Logic, the predicate had hitherto been regarded as exclusively the whole, and the subject as a part of this whole or predicate. *The river runs* had been understood in the sense that the river is one or a part of the class or whole running things. There are other running things. *Man runs* and *the horse runs*. The river is only one of them. But Hamilton would urge that the subject is a whole as much as the predicate, and it too may contain the predicate as a part. Thus in *the river runs*, the river or subject may be regarded as containing as a part of its concept the single attribute *running*; but this is only one of its many attributes, and *running* is but a part of its whole concept. Here the subject is the whole, and contains in it the attribute as a part. This, too, is a logical whole; it is the relation of whole and part in thought, as much as the

relation in extension of the subject to the predicate as the whole. Why, then, should Logic neglect this? Every proposition and every reasoning is, in Hamilton's view, affected by this distinction, for we may read each proposition, each reasoning in turn, in the whole of Comprehension and in the whole of Extension. Nay, the reading in Comprehension of the subject as whole is the primary and natural reading of a proposition; the reading in Extension is only secondary and derivative, being founded on the Comprehension. The statement made by Mill that Hamilton separated these forms, or held the extensive reading to be possible by itself, or real apart from the implied comprehensive reading, is merely one of his innumerable misrepresentations of plain and explicit statement. Comprehension is essential to extension; extension is inseparable from comprehension; where the one exists the other exists; yet they express different aspects of the same matter, different relations in the mind, and so yield different kinds of reasoning. Hamilton expresses the distinction in the propositions of extension and comprehension, by saying that the copula *is* means in the former is *contained under*, whereas in the latter it means *comprehends* or *contains in it*. Thus *God is merciful*, means in extension is *contained under the notion* (or *class*) *merciful*; in Comprehension it means, *God comprehends in it the attribute* (notion) *merciful*.

(a) Mill objects to this doctrine that "these two supposed meanings of the proposition are not two matters of fact or thought reciprocally inferrible from one another, but one and the same fact written in different ways; that the supposed meaning in Extension is not a meaning at all, until interpreted by the meaning in Comprehension; that all concepts and general names which enter into propositions require to be construed in Comprehension, and that their comprehension is the whole of their meaning."—(*Examination*, p. 362.) "'All men' and 'the class man' are expressions which point to nothing but attributes; they cannot be interpreted except in comprehension." There is little in this that has any relevancy as a counter-statement to Hamilton's doctrine. To suppose so is a mere mistake. The only thing about it that calls for notice is the extravagance of the assertions that extension is not inferrible from comprehension, and that there is "meaning" in comprehension alone. If by "meaning" Mill means the attributes of the notion, it is self-evident that meaning belongs to comprehension alone. But does "the class man" mean "nothing but attributes"? Does it not indicate or imply individuals with attributes? Does not any attribute imply some subject of inherence? And if so, is there not both room and need for the extensive

proposition? And is not this further or other meaning or implicate of the attribute necessarily involved in its very predication? And if so involved, is it not a new form of judgment inferrible from the other?

Hamilton says a judgment can be read both in Comprehension and in Extension—*God is merciful* means either *God is contained under merciful*, that is, under the notion merciful, or class of merciful beings; or God comprehends merciful, that is, the notion *God contains in it the attribute merciful*.

Mill says no. When we say God is merciful, we speak not of the notion God, but the Being God. In Comprehension it means, "this being has the attribute signified by the word *merciful*." In Extension it means, "The Being, God, is either the only being, or one of the Beings forming the class merciful. The difference is that the second construction introduces the idea of *other possible merciful beings*, an idea not suggested by the first construction. This suggestion gives rise to the idea of a class merciful, and of God as a member of that class; notions which are not present to the mind at all when it simply assents to the proposition that God is merciful."—(*Examination*, p. 432.) Has Mill in these statements really said anything that in the least degree controverts Hamilton's interpretation of propositions in Comprehension and Extension? Nay, has he not fully admitted, even in words, that very construction which Hamilton puts upon them? In Mill's view we can have the comprehensive meaning of the proposition in the mind without having the extensive. We can think *God is merciful*, has the attribute, and not think at the same time that *God is one of the class merciful*. Does he not see that the moment God is thought to possess the attribute, other beings too, at least ideal, may; and that thus there is necessarily implied and constituted a class through the possible application of the attribute? Wiser than all, however, is the supposition, at once groundless and irrelevant, that we are not speaking of the notion of God, but of the Being God. Pray, how can we speak of the Being except through the notion of the Being God? How can we with a meaning speak of anything except through its notion, or as we have the notion of it in our mind? Is it words we are speaking of merely? mere blank unintelligibility? or are we speaking of things in themselves which are quite superior to our notions?

But his whole criticism of this point is a mass of contradiction.

(1.) On the previous page (p. 432) the objection is taken that the judgments in Comprehension and in Extension are totally distinct; that the latter introduces what was not at all in the mind while making the former.

(2.) On page 433, these are affirmed to be "one and the same assertion in slightly different words." Here he contradicts No. 1.

(3.) The judgment in Comprehension warrants by immediate inference a judgment respecting Extension, but this judgment respecting Extension is in Comprehension. In other words, there are two different judgments in the case, and yet only one in kind.

(4.) But how does he show both in Comprehension? "A is part of class B." "The concept A comprehends the attribute of being in-

cluded in the class B"—or "Man is mortal." "Man comprehends the attribute of being included in the class mortal," or rather as with no class predicate, "Man comprehends the attribute of being included in the attribute mortal," which is neither sense nor truth; for man is not included in the attribute, mortal. The attribute may exist without including man, though he includes the attribute, and is included under the class, which is a very different point. But apart from its falsity, what a luminous and scientific statement have we here! "Gold is in the class mineral." "Gold includes the attribute of being included in the class mineral." Pray, what is the attribute in addition to the attributes of the class mineral which gold includes or comprehends? It includes the attribute of being included? Is this in addition to being one of the class mineral, or what?

(b) Mill admits that the relation of whole and part applies to judgments in Extension (in affirmative propositions). "The object or class of objects denoted by the subject is a part (when it is not the whole) of the class of objects denoted by the predicate." This holds, too, he admits, in analytical judgments in comprehension. But in synthetical judgments in comprehension,—“the relation between the two sets of attributes is not a relation of Whole and Part, but a relation of Coexistence.” *Hoofed animals are ruminant.* Supposing this synthetical *ruminant* coexists with *hoofed animals*, does not the judgment in the synthetic act join *ruminant* to the subject *hoofed-animal*, and make it a part of my concept of hoofed-animal? What is the sense of talking of coexistence except for the purpose of a semblance of difference? Did *ruminant* coexist in my mind with *hoofed-animal*, before I knew that *hoofed-animal* was *ruminant*? If so, did this coexistence constitute a judgment? Surely not. At length I knew that *ruminant* was an attribute of *hoofed-animal*, or I felt myself justified in so alleging. Then I judged or joined them, and I expressed this in a proposition. But is this any longer mere coexistence? Is not *ruminant* now a part of the whole subject *hoofed-animal*? Is this not as much a relation of whole and part as any case of Extension? The very act of synthesis abolishes mere coexistence, makes a union, constitutes whole and part.

(c) "All judgments are really judgments in comprehension, except where both the terms are proper names. We never really predicate anything but attributes, though, in the usage of language, we commonly predicate them by means of words, which are names of concrete objects." "When I say the sky is blue, my meaning and my whole meaning is that the sky has that particular colour. I am not thinking of the class of blue as regards extension at all. I am not caring nor necessarily knowing what blue things there are, or if there is any blue thing except the sky. I am thinking only of the sensation of blue, and am judging that the sky produces this sensation in my sensitive faculty, or (to express the meaning in technical language) that the quality answering to the sensation of blue or the power of exciting the sensation of blue, is an attribute of the sky." "So in all oxen *ruminant*. I have nothing to do with the predicate considered in extension. I may know or be ignorant that there are other *ruminant* animals besides oxen. The comprehension of the predicate, the

attribute or set of attributes signified by it, are all that I have in my mind."—(*Examination*, pp. 423, 424.)

The subject, too, is an attribute or sum of attributes only. *All oxen ruminate*. There is no image of all oxen. I do not know all of them, and I am not thinking even of all those I do know. All oxen means "not particular animals, but the objects, whatever they may be, that have the attributes by which oxen are recognised, and which compose the notion of an ox." "Wherever these attributes shall be found, there, as I judge, the attribute of ruminating will be found also." "This meaning supposes subjects, but merely as all attributes suppose them." Or if, as Mill admits later, "attributes, even, if they come to be conceived, cannot be conceived in a detached state, but are always (as may be said by an adaptation of the Hamiltonian phraseology) thought through objects of some sort."—(*Examination*, p. 426.)

First, these statements are absolutely contradictory. It cannot be true that the subject of a proposition is an attribute alone, or sum of attributes alone, if every attribute implies a subject. That of which I speak is a subject with attributes.

Secondly, it is not true that the predicate is only and always an attribute or sum of attributes. This is the first form of predication, but it is not the only one. It is not true that when I say the sky is blue, I express only an individual fact. This might have been the case at the point of the earliest abstraction. But now *blue* is already a general concept or term, applicable, or possibly applicable, to many objects. My first conscious impression of the sky as blue could not have been put in words. I could not have said *blue*, unless I already had assigned a meaning to it in thought, as a term indicating an attribute generalised and thus formerly frequently experienced. *Blue* means previous knowledge; it means not *red*, *white*, *black*, or *green*. And all this implies generalisation and discrimination. And when I now speak of the sky as blue, I discriminate it from other colours, and thus mean more than merely saying it is blue. In this sense there is already an implicit attribution of quantity to the predicate.

Thirdly, it is contradictory to say all oxen ruminate, and to say that I do not know whether all do or whether even some do. It is not necessary that I should know every ox in the sense of having seen every ox past, present, and to come, much less that I should have in my mind "the images of all oxen." What an image! But when I speak of all oxen, it is necessary that I should have in my mind the equivalent or representative of all oxen as objects.

If all our ordinary, usually all, judgments are in Comprehension only, Extension not being thought of, perhaps Mill might have told us how in that case we can speak with discrimination of *all* or *some*? When I say *oxen ruminate*, I express only certain attributes of oxen, but what of the *all*? Has this no meaning? If it has a meaning, is this meaning in Extension or not? When I say, *some men are vicious*,—*are burglars*,—what does the *some* mean? Does it mean attribute, or quantity in Extension? Surely if I can speak with knowledge of *all* or *some* of the subject, I have more in my mind than the mere attributes of the subject. Mill's theory is utterly inconsistent

with the possibility even of a definite proposition, or even ordinary statement.

He further confounds together as equally "collective, though in definite aggregates," *all* oxen and *some* ruminant. He thus abolishes the very possibility of a discrimination of universality and particularity in propositions, by identifying the universal and particular as indifferently expressions of the same.

Further, though propositions with him are only in Comprehension, yet logicians were right in admitting only into their logical system reasoning in Extension. "They did not concern themselves with propositions or reasonings as they exist in thought, but only as they are expressed in language."—(*Examination*, p. 429.) A very philosophical procedure this. They did not concern themselves with what is admitted to be the true reality of the proposition or reasoning, what it is in thought, but with what it is in language, which is not as it is in thought, but not necessarily in thought at all. Whatever absurdity or inconsistency is to be perpetrated, let it be done if a position of Hamilton can be contradicted. "The propositions in Extension being, in this sense, exactly equivalent to the judgments in Comprehension, served quite as well to ground forms of ratiocination upon." "They are practically equivalent—that is, so long as the propositions in words are always true or false, according as the judgments in thought are so."—(*Examination*, p. 429.) Will any one explain how it is possible that a judgment in thought can be equivalent to a proposition in language which has no counterpart in thought? Or if the comprehensive judgment is the same with the extensive, while "the mode of contemplating the fact is different," the act of thought being not only a distinct act, but an act of a different kind," will it not be necessary philosophically to vindicate this ere we can accept the form of reasoning in Extension for form in Comprehension? Nay, these things being so, is not Hamilton right in saying that the ordinary logicians have erred in neglecting reasoning in comprehension, the primary essential form of reasoning, the reasoning of the very inner thought, and instead dealt with reasoning as vulgarly expressed in ordinary language, without telling us what it really represents?

§ 286. Determination, that is, fixing or settling, is essential to judgment, whether it be in Comprehension or Extension. In the former, where predicate is an attribute, we determine the subject by the attribute, as—*plant has organisation, man dies, beauty fades*. Thus we limit or determine the subject by the predicate, and exclude it from the opposite or indefinite class.

In Extension, determination means the setting of a subject under one definite class, to the exclusion of other classes, as *man is mortal, critics are fallible, insects are short-lived, dogs are sagacious*.

Logical determination is impossible apart from a previous

knowledge of the characters of the subject and predicate. And any determination in regard to actual experience is either by means of what we already know, and, therefore, secondary, or in virtue of the first spontaneous acts of intelligence conditioned by what is actually presented to us, and what, therefore, determines us, rather than we it. There is no determination by us even possible, apart from the secondary logical process, or the spontaneous cognition through intuition of objects and relations, given us to know. We can put nothing into objects which are either wholly indefinite, or which are not cognised by us as already furnished with definite relations.

(a) Mill utterly mistakes the meaning of Determination, and this has helped to lead him astray on this point. He asserts that it means only "our conceiving one of two notions as adding on additional attributes to the other." Hamilton of course uses no such redundant phrase in connection with the verb "to determine," or with determination. And Mill's representation of Hamilton's meaning has really nothing whatever to do with determination itself. It is a clumsy and inaccurate way of stating what Hamilton had explained, when Determination was used "in a particular relation," &c.—viz., the process of Specification, "when descending from the highest notion, we, step by step, add on the several characters from which we had abstracted in our ascent . . . and thus limit or determine more and more the abstract vagueness or extension of the notion."—(*Logic*, xi., iii. p. 94.) We determine a notion, whether the predicate be an addition to the subject or not, whenever we make an affirmation. When we say that the number *four*, or our notion of it is made up of the units 1, 1, 1, 1 in succession, we have determined our notion, though we have added no new attribute. And when we say that the conscious act is or exists, we have determined our subject-notion, though we have added nothing to it. When we say this colour I perceive is red, we have determined, because we have restricted the subject we speak of to a definite class of things: the determination lies in the act of judging, and, as Hamilton points out, only in that; for until we have judged congruence (or confliction), there are only floating, unconnected concepts.

§ 287. Concepts and Judgments, as Hamilton expressly holds, and constantly repeats, are the results of the same process, Comparison. Every concept is, in fact, a judgment fixed and ratified in a sign. In consequence of this acquired permanence, concepts afford the principal means of all subsequent comparisons and judgments. A concept may be viewed as an implicit or undeveloped judgment; a judgment as an explicit or developed concept. He, accordingly, defines judgment, logical judgment, thus: "To judge is to recognise

the relation of congruence or of confliktion, in which two concepts, two individual things, or a concept and an individual compared together, stand to each other."¹

Congruent concepts are such as are mutually compatible and representable in the same indivisible act of thought. They may differ in themselves from each other—as *learning* and *virtue*, *beauty* and *riches*, *magnanimity* and *stature*; but as each of these pairs may be easily combined in the notion we form of one thing or subject, they are congruent. Conflictive notions, again, are those only whose difference is so great that each involves the negation of the other, as *virtue* and *vice*, *beauty* and *deformity*, *wealth* and *poverty*.² Congruence and confliktion, it should be carefully noted, express a relation of concepts under comprehension, and viewed as attribute or sum of attributes.³ As attributes, congruent concepts are said by Hamilton to coincide or coexist together, in thought, though they are not in themselves identical, because they form elements of one mental image or representation. As attributes, conflictive concepts cannot be united in one representation, either because one immediately negates another—contradictory opposition—that is, the one abolishes directly what the other establishes; or because one mediately negates another—contrary opposition—that is, when one concept abolishes what the other establishes through the affirmation of something else. It should be observed that concepts are not in themselves affirmative or negative. In so far, however, as two concepts afford the elements, and, if brought into relation, necessitate the formation of an affirmative and negative proposition, they may be considered affirmative and negative.⁴ To give, thus, the distinction between two concepts simply as congruent, or two concepts simply as conflictive, and judgment proper, we have to accentuate the recognition and expression of this congruence or confliktion. We advance, in fact, from the simple representation or mere conception to the stage of the *is* and the *is not*, as expressing the relation conceived between the concepts as elements or terms of the judgment. Thus, for example, we may have the three concepts or thoughts, *water*, *iron*, *rusting*. These as mere concepts are

¹ *Logic*, L. xiii., pp. 225, 226.

² *Logic*, L. xii., p. 214.

³ *Logic*, L. xii., p. 213.

⁴ *Logic*, L. xii., pp. 215, 216.

congruent; they are capable of being represented in imagination in one notion, or as the elements of a single notion, that is, a complex notion. If, however, we proceed beyond this, and, so to speak, articulate the relation subsisting among them, we form a judgment, an affirmative judgment, and we say *water-rusts iron*. In this, of course, we meanwhile pronounce no judgment on the matter of fact, whether this is truly and really a fact of experience or not. All that we are supposed to have before us is the material or constituted concepts in which we find or are supposed to find no incompatibility. And the act of judgment is the recognition and expression of this compatibility.

(b) Mill actually criticises this illustration as if Hamilton had contended that we know or discover the truth or fact that *water rusts iron*, from comparing merely the concepts or thoughts *water, iron, rusting*. The proposition, he holds, expresses a sequence or connection between the facts, not between our concepts. "If we lived till doomsday, we should never find the proposition that *water rusts iron* in our concepts, if we had not first found it in the outward phenomena." Did Mill for a moment seriously imagine that Hamilton, or any sane person, ever held the converse of what he here states? or that when Hamilton speaks of the congruence, he meant to imply that? But did Mill suppose that when he substituted the word *facts* for *thoughts*, he could possibly deal with the phenomena *water, iron, rusting, per se*, or apart from our concepts or thoughts of them? Yet this must be so, if Hamilton is to be corrected. What is the fact of *water, iron, rusting*, apart from our knowledge or thought of the fact? When we compare these, present or absent in sense, what are we comparing but our thoughts or concepts of them? Even in a real judgment, or judgment about a matter of fact, it is, after all, our thought, knowledge, or concept of the fact with which we are dealing, and which we compare in the subject and predicate of a judgment. Does Mill suppose that we can deal with facts which are not thought and known facts? When he further talks of such a judgment as resulting from "direct remembrance of the facts," his position is quite as suicidal, unless he can show that remembrance of the facts is a thing apart from conception of the facts.

§ 288. Judgment, that is, logical judgment, supposes the concepts given. It thus supposes them to be in themselves conceivable, that is, actually concepts, each conceivable by itself, therefore, not in themselves self-contradictory, not violating any logical law of conception, and not violating any material law of conception. Logically, then, judgment is restricted to recognising congruence or confiction under the condition of non-contradiction. What is non-contradictory is logically

congruent; and hence "all positive and affirmative notions are congruent, that is, they can, as far as their form is concerned, be thought together; but whether in reality they can coexist, that cannot be decided by logical rules."¹ Hence, even contrary opposition is not decided on logical grounds, but on material, on the incompatibilities of intuition, or of the matter of the concepts. *A, B, C,—sitting, standing, lying,—black, red, blue*—are groups of contraries, because we cannot unite the attributes they represent in one image. But this we learn from experience. While *A* and *not A—sitting* and *not sitting*, we can at once, *a priori* or logically, pronounce to be conflictive, the moment the terms are enounced. Mediate or contrary opposition (confliction) comes under logical rule only indirectly. *Sitting* is incompatible with *standing*, *blue* with *white*, because perception does not give us and we cannot represent each pair together, but only in separate intuitions. But logical law can deal with contrary opposites the moment they are known to be such, and constituted into the members of a sphere of opposition. Logical law can regulate the passage from the one to the other, by affirmation or by negation.

§ 289. It would seem from this that what attributes are opposed mediately or in contrary opposition, must be learned from experience; while contradictory opposition may be determined by simple logical law. I must learn, for example, that *sitting, standing, lying, walking*, are conflictive concepts from experience wholly; while *sitting* and *not-sitting*, *standing* and *not-standing*, are known *a priori*, or from the concept itself, to be conflictive. The congruence or compatibility of attributes must thus in the main be learned from intuition, the observation of the realities which are combined in the outward or inward world of our experience. In our concept of *tree*, we combine *form, colour, growth, organisation*. Our only means of knowing these to be compatible is through "a reference to intuition and representation working on the data of sense. The confliction of attributes must be learned in the same way, all except those that are immediately contradictory. We cannot combine in one and the same surface *black and white*, or *red or green*, because intuition never gives us such a combination, but the opposite. The

¹ Hamilton, *Logic*, L. xii., p. 216.

barrier in this case to unifying, or to congruence. But in whatever way congruence between attributes may arise, whatever its ground or conditions, its test logically is the power of representing the two attributes as in the one subject, or the one attribute as a mark or attribute of the other. When we can do this, and when we recognise and enounce the congruence, we have an act of judgment,—properly logical judgment.

(a) It has been remarked on this point of the congruence of notions, that it may be of two different kinds. The concepts or attributes may be such as we must necessarily unite in thought, or such as we may or may not unite, according to circumstances. *Man* and *animal* are concepts of the former kind; *man* and the concept *ten feet high* are of the latter.—(Monck's *Hamilton*, p. 132.) Hamilton has himself touched on this distinction, when he distinguishes notions in Comprehension as *Intrinsic* and *Extrinsic*. The former are made up of those attributes which are essential, and, consequently, necessary to the object of the notion. The latter consist of those attributes which belong to the object of the notion only in a contingent manner or by possibility.—(*Logic*, L. xii., iii. p. 216.) But this is wholly extra-logical.

The knowledge of what is essential to the object of a notion is obviously a process subsequent to the formation of the notion itself. The object of a notion is simply that of which the attributes of the notion can be predicated; and when the attributes of the notion can be predicated, there is the object of the notion. *Animal* or *organised* is necessary and essential to the notion *man*, because we have already determined the notion as that which possesses this particular attribute. This is a wholly hypothetical necessity; it is an analytical exposition of the contents of a given notion. *Ten feet high*, again, is a possibility and a contingency of the notion; it is compatible with it, but not essential to it, or an element of the definition of that which would constitute a man. But the congruence needed for the judgment is the same in both cases, and it is fulfilled in both cases. If we say *man is animal*, or *man is organised*, we judge,—we enounce congruence, and congruence between man and one of its essential, because already determined, characters. If we say *man is ten feet high*, we judge equally,—we enounce congruence between man and a character not essential to the notion or a part of it. We have fulfilled all the conditions of (formal) judgment in this latter case; but we have erred if we imply that the attribute *ten feet high* is an essential, that is, already defined, character of *man*, the concept. This distinction, accordingly, of the essential and the non-essential characters of the concept is extra-logical, and in no way affects the nature of logical judgment as in itself simply the enunciation of congruence or confliction.

§ 290. This leads to the further question—Is Judgment, as thus defined, limited to Analytical Judgments alone? Or

does it also include Synthetical? In the analytical predicate we enounce an attribute already contained in the subject, as *body is extended*. In the synthetical judgment we add or enounce a new predicate not already contained, or rather not known to be already contained in it. The law of Identity warrants the former enunciation; it cannot of itself warrant the latter, or lead us to it. I do not see that this should give rise to any difficulty. In the first place, the distinction between synthetical and analytical judgments is in a great measure relative. What is synthetical at one stage becomes analytical at another, when the concept is more fully determined. This is the case with most scientific concepts. In the second place, even though the attribute confronted with the existing concept be new, its congruence with it alone satisfies the affirmative judgment. Experience may evolve a new attribute, congruence is still the logical test of its (possible) combination. That it is actually combined is grounded on conditions not involved in the mere congruence. This is to confuse congruence with belief in the reality of the congruent. In case of synthetical judgments *a priori*, as cause added to the concept of an event apparently beginning, the ground of the assertion is extralogical, not found in the law of Identity; but the recognition of congruence between the concept of an event apparently commencing and a cause is still there, and there as a condition of its assertion as a law of reality. The distinction of synthetical and analytical judgments, whether well founded or not, in no way affects the doctrine that congruence of representation is the condition of the logical judgment, and that this judgment consists in apprehending and enouncing the congruence.

§ 291. In synthetical judgments *a priori*, there is of course no preliminary comparison of two concepts. The subject concept is supposed to be given, and to this we add the new predicate concept. We have, for example, an apparent commencement of an event in time; we add on the concept of cause and form a synthetical judgment. The relation between the two concepts is said to be necessary. Thinking the one, I must think the other. But in this case, are we correct in holding that the subject concept is conceived first and independently, and then the predicate concept is added to it? If

the concept event and the concept cause be correlatives, and necessary correlatives, can the one be conceived apart from the other? Is not the true state of the case this,—that there is the coequal revelation of one double-sided concept; and the so-called synthesis or adding on of the predicate is a mere making explicit of what we think implicitly and vaguely? If this be so, the so-called synthetical *a priori* judgment is simply the full consciousness of a necessary relation, and different altogether from judgments of experience, in which we add on not by way of necessity, new attributes or concepts to the subject. The nearest approach to the synthetical *a priori* apprehension is in those cases where an attribute is ultimately seen to be necessarily implied in a given attribute, as *divisibility in extension*, although this judgment is synthetical only relatively to the development of our knowledge, and not in relation to the nature of the original notion.

§ 292. Logically all judgments are analytic, for judgment is an assertion by the person judging of what he knows of the subject spoken of. To the person addressed, real or imaginary, the judgment may contain a predicate new—a new knowledge. But the person making the judgment speaks analytically, and analytically only; for he sets forth a part of what he knows belongs to the subject spoken of. In fact, it is impossible any one can judge otherwise. We must judge by our real and supposed knowledge of the thing already in the mind. Even when we add a wholly new predicate to the subject, as in scientific discovery, we, in the judging, state only analytically what we already know. Even when we form a synthetic judgment *a priori*, we analyse a complex notion; for as the so-called new predicate is a necessary one, a necessary correlative, we never really had the subject in the mind *per se*, but always with the predicate implicitly.

§ 293. What, then, it may be asked further, is the import or nature of this act of judgment? What is the condition, so to speak, implied in it? The answer, in the first place, is, that this recognition, when affirmative, or of the congruent, is a determination, a limitation. It is also, in a sense, a determination, when negative, or of the conflictive. How in one complex notion, first, can we conceive two notions as in one, or as united in an affirmative judgment? Clearly the notions cannot be regarded as both subjects in a judgment, that is,

as both equally determined or limited, for there is nothing here in the one to limit the other. They are still represented or conceived apart. But an affirmative judgment requires and expresses union,—the union of two. Hence the one notion must stand to the other in the relation of subject to predicate, that is, something must be attributed to the subject, or the subject must be included under some class-notion. For the same reason, the two notions, if attributes, cannot be regarded as one, or as united in a judgment, if neither determines or qualifies the other. There must thus in a judgment be a relation of the thing or concept determined (the subject), that by which it is determined (the predicate), the relation or determination between the two (the copula). These three elements constitute one indivisible act of thought. Thus a judgment is a determination, a limitation. For example, we say *iron is a mineral*. The subject *iron* is limited to or by the notion *mineral*. If *mineral* be regarded as a class, *iron* is a part of it, or included under it, that is, limited to it, as distinguished from the sphere outside of it. If *mineral* be regarded as an attribute, it is a part, mark, or character of the notion *iron*, that is, it is limited to it or distinguished from what does not possess it. *The electrical is polar*. *Electrical*, if taken as attribute, has *polar* as an attribute or mark of it. It is subject, or determined; *polar* is predicate or determining. In each case, however, whether the predicate be class or attribute, the subject is thereby marked off, limited, distinguished from what it is not, from other things not possessing the distinctive mark or belonging to the definite class. Hamilton, accordingly, finally defines logical judgment “to be the product of that act in which we pronounce that of two notions thought as subject and predicate, the one does or does not constitute a part of the other, either in the quantity of Extension or in the quantity of Comprehension.”¹

The phrase, “a part of the other,” will mean, in the case of Extension, that is, where we compare a subject with a class-notion, as *man* with *organised*, a portion of the class, an object or individual under the extension of the class, and thus one with it when actually thought in connection with it.

In the case of Comprehension, “a part of the other” will mean that the predicate is thought as a mark, character, or

¹ *Logic*, L. xiii., p. 229.

attribute of the subject, and thus conceived as one with it, as it may be either inseparably connected with it, or as, for the time at least, actually connected with it in the unity of a single complex notion. Congruence, as thus finally explained or elucidated by Hamilton, does not imply in the case of the comprehensive predicate that it is identified with the subject. He does not say that *the electrical is polarity*, or that *electricity is polarity*,—that *free-intelligent is responsibility*, or that *free-intelligence is responsibility*. He says the *electrical* contains *polarity* as a mark or attribute, or that *polarity* is a mark of *electricity*, or that *free-intelligent* contains in it *responsibility*. There is a congruence, a unity between the notions, when, compared as subject and predicate, the one forms part of the other.

(a) Mill puzzles himself sadly over these two statements or definitions of Judgment, and regards them, as usual, as inconsistent. He cannot reconcile the "congruence" of the first with "a part of the other" of the second statement. So far from being inconsistent, the latter phrase simply renders the former more explicit. "Congruence" does not mean, as Mill conceives, that "the attributes comprehended in both of them [the concepts] can be simultaneously possessed by the same object." Hamilton says no such thing. All the congruence he needs or asks for is that they can be simultaneously *thought or conceived* as possessed by the same object, or better, united in the same subject of thought,—that they be not in thought repugnant. Nor does the phrase "a part of the other" mean, as he imagines, that "the one concept is actually a part of the other." It means simply that the one concept is conceived and pronounced to be in thought an object under a given class, or a subject possessing a definite attribute. There is no distinction here corresponding to "a part of" and "along with." *Learning* and *virtue* are congruent, since I can conceive them together in the same object of thought, and in the same indivisible act of representation. They are thus conceived along with each other in one act, while *virtue* and *vice* cannot be so represented. But I do not say, or need to say, that *learning* is *virtue*, or *virtue* is *learning*. So when I say that *learning* and *virtue* are parts of the comprehension of the notion of Socrates, or of the notion of an ideally perfect man, I no more say, or need to say, that *learning* is *virtue*, or *virtue* *learning*. But, as parts of the same complex notion, they are congruent. The latter statement about judgment simply explains the two forms of Congruence, that which lies in a subject possessing, or conceived as possessing, parts or attributes; and that which lies in a subject conceived as being a portion of a (wider) class than itself.

There is not the slightest contradiction in Hamilton's doctrine here. Two attributes, or groups of attributes, are congruent when we can think them as one, or in one notion as coincident, as the one qualify-

ing the other, and not unless this be so. We cannot think *wisdom* and *circle* as one or congruent, or the one as qualifying the other, but we can think *circle* as *white* or *black*, as thus qualified and determined. And in this case the blackness or the whiteness is part of the concept we form of the circle, not along with it merely, but one of its qualities in the group of qualities which we name this circle. Hamilton illustrates this by the notions *electrical* and *polar*. He says "we cannot think the two attributes *electrical* and *polar* as a single notion, unless we convert the one of these attributes into a subject to be determined or qualified by the other."—(*Logic*, iii. p. 227.) Mill asks, "Do we ever think the two attributes *electrical* and *polar* as a single notion? We think them as distinct parts of the same notion, that is, as attributes which are constantly conjoined."—(*Examination*, p. 344.) Does Mill not know what a single notion in Logic means? Does he suppose that a single notion means only one or a single attribute, or two attributes identified? Does he not know that a single notion is not necessarily a simple notion, but may be a complex notion, provided only the attributes which make it up can be thought in one representation, and not merely successively, or as repugnant?

Hamilton has not two meanings of the word "congruent," as applied to the concepts of attributes. He does not mean by it "along with" at one time, and at another "actually a part of." His sole test of congruence is compatibility of representation of the two attributes in the same subject; but he does not make the one attribute a part of the other. He does not say that *beauty* is a part of *riches*; but he says we may represent and affirm these attributes to belong to one and the same subject, or that *the beautiful one is rich*. And then *rich* or *riches* is a part of the subject-notion, a part of that subject which is beautiful.

We might no doubt form a judgment in which we should make one attribute a part of another attribute, as when we say *extension* is (*contains in it*) *divisibility*. We know that *divisibility* is a necessary implicate of *extension*. But we do not identify the two; we say only *divisibility* is a mark of *extension*, or the subject-notion *extension* has as part of it *divisibility*. It would certainly be ridiculous in this case to say that the judgment states that *divisibility* is conceived merely "along with" *extension*; that thus the two can be conceived apart; and that all we assert in the judgment is a separable conjunction.

(b) Mill conjures up another inconsistency, in what he calls Hamilton's first theory of judgment. Judgment is regarded as the recognition of congruence or confliction not only between concepts, but between "two individual things." But as in the so-called second theory, Hamilton declares it to be "the product of that act in which we pronounce that of two notions, thought as subject and as predicate, the one does or does not constitute a part of the other, either in *Extension* or in *Comprehension*," he is to be held as denying that one individual thing is predicable of another; "one at least of the terms of comparison must be a concept." It would be enough to say, in regard to this, that Hamilton recognises a "notion" of the individual, where the image of the individual and concept proper coincide. But Mill further contends that "if the predicate in a judgment be held to be part of the

subject, then the individual cannot be predicable of an individual; for one notion of an individual object cannot be a part of another notion of an individual object. One object may be an integrant part of another, but it cannot be a part in Comprehension or in Extension. St Paul's is an integrant part of London, but neither an attribute of it, nor an object of which it is predicable."¹ Here we may well ask, Did Mill know what is meant by predicable? Evidently he supposes that predicable means only affirmatively predicable, and, in fact, identification. We cannot say *London is St Paul's*, but we can say what is correct, that *London is not St Paul's*; and thus St Paul's, the individual thing or notion, is the predicate of London, the individual thing or notion. We cannot say, *The donkey is its leg*, but we can say, *it is not*. And here we as truly predicate, as if we had identified the donkey and its leg. But is it so certain that one individual cannot stand as a logical part, say attribute or determination in relation to another individual object? Can the individual as predicate not be logically a part of the subject? The truth is, that one individual notion can be part of another, can be affirmatively predicated of another. We affirm this every day. We do it when we speak of Sir Isaac Newton as *the author of the Principia*, or of Victoria as *the Queen of England*. In these subject and predicate are strictly individual notions, and the predicate is part, and in a good sense a part only, of the subject. A little further on, Mill, in pursuance of his chimerical contradictions, represents Hamilton as holding that, in order to form concepts, we first of all compare and judge between individual objects; and he maintains this doctrine to be true. If we so judge apart from concepts, do we not predicate, both affirm and deny, one individual thing of another; and in so predicating, do we not pronounce the one thing to be or not to be a part of the other? Hamilton is perfectly consistent, Mill is neither accurate nor consistent.

(c) It may be objected that congruence between two concepts is sometimes partial, and thus that the same two concepts may be described as both congruent and conflictive, as the ground thus equally of affirmative and negative judgments. Thus, *tall* and *man* are congruent,—*some men are tall*. Again, they are conflictive,—*some men are not tall—they are dwarfs*. But this has nothing to do with congruence in comprehension, or attribute: and Hamilton is dealing with congruence as a relation under comprehension. *Man* and *tall* are congruent as attributes; and we may unite them formally, that is, unite them in one subject in a judgment. We may also unite them really, or as in presentation. This implies also that so far their extensions coincide. Comprehension implies always some (imaginary or real) extension. But it does not imply absolute coincidence or co-equality of extension. That the extension of a congruent concept, say *tall*, is wider than the extension of that with which it is congruent, say *man*, is no proof that the two concepts are not congruent in comprehension or as attributes, or, in other words, that as attributes they are to be regarded as both congruent and conflictive. Further, when *tall* is predicated of *some men*, and *not-tall* of others, there is no conflict.

¹ *Examination*, p. 422.

tion, for we are speaking of different subjects or portions of the same class.

(d) This mode of speaking of Judgment as the comparison of one notion with another, and the recognition of the one as a part, comprehensively or extensively of the other, or as not a part, requires some slight modification to suit Hamilton's later doctrine that a proposition is, in extension, an equation or non-equation of subject and predicate. It needs no change to suit it to his later statements of the comprehensive proposition, for from this he properly excludes the notion of quantity (see *Logic*, Appendix iv. 271 and 276) in the sense in which it is applicable to the proposition in extension. But even with regard to the judgment in extension there is no conflict between the earlier and the later doctrines. In the four affirmative propositional forms, the earlier language applies strictly,—to (Afi) *all is some*; (IfA) *some is all*; (Ifi) *some is some*. With regard to Afa,—or *all is all*,—we compare two wholes; and regard them as convertible. But logically the predicate whole is declared to be the constituent of the subject whole. *All equilateral is all equiangular*. *Equiangular* is “a part” of *equilateral* in the logical sense of the coincidence of one notion with another. That they wholly coincide, or are coextensive, does not destroy the concept of them as reciprocally parts of the whole notion of *equiangular-equilateral*.

§ 294. The element of determination of the judgment in comprehension may, in a sense, be said to depend on the amount or degree of the specification of action and object. (1.) This may be said to be incomplete, as *Bruce gained a victory*, or *the man was killed*. (2.) Or complete, as *Bruce gained a victory at Bannockburn over Edward II.*; *the man was killed by being run over by the express*, &c. Completeness and incompleteness of determination are relative to the purpose or end of the judgment. It depends, indeed, on what we mean precisely to assert, or need precisely to deny. The distinction made by some between objective completion and objective determination is wholly groundless, from a logical point of view. Every determination by any attribute whatever, or by any class whatever, is a completion of the judgment; because this is a case of determination against indetermination,—of a definite affirmative against a negative. Of course, looking to the actual fact or possibility of observation and generalisation, any determination, through a predicate, is incomplete. But this has no logical significance. The logical essence of the judgment is as clear and marked in the first predicate as in the most advanced, or in the most complex series. When I say *this is*, my judgment is perfectly complete or determinate, as contrasted

with its negation, *this is not*. And when I say *this is a metal*, the judgment is really not more determinate as a judgment, though the predicate contains more attributes, for the determination is always in relation not merely to the possible predicates of the subject, but to what I know definitely of the subject. As against the knowledge asserted there is always the negation of the opposite determination.

§ 295. Judgment in its objective relation may be supposed to represent all the actual and possible forms or relations of existence. The first relation of existence is a thing and its quality,—a substantive or permanent, and its action or property. This is equivalent to the relation of inherence or of subject and phenomenon. The subject of the judgment may be taken as representing the thing or permanent subject, the predicate as representing the action, quality, or property. In language these are expressed by the noun and the verb. This form of judgment is in logical language the comprehensive,—the predicate is regarded as quality or attribute. Under this head of comprehension is included every judgment which expresses the relation of causality between thing or cause and its effect, as *the sun is the cause of heat*, *opium causes sleep*. The action or the passion in a given case may be related to the subject as a singular effect, or it may be regarded as the fixed and constant effect of the thing. This would yield one feature of the distinction between accident and property.

Sequence, concomitance, and coexistence may fairly be regarded as coming under Comprehension. *The sun is followed or accompanied by day*. *A is constantly followed or accompanied by B*, or *A and B always coexist*. Things related alike in time and space, through uniformity or constancy of conjunction, come under the head of subject and property. There may be simple simultaneity, and simple co-adjacency, as in the case of my writing while the clock strikes twelve, or the co-adjacency of the planets in space. *This* and *that* may be together in time or in time and space, apart from the relation of cause and effect, or of substance and accident; but a judgment regarding these would come under the head either of simple individuals or of classification by resemblance in time or in time and space. And this suggests the second great relation of things indicated

by judgment, that is, similarity or resemblance among the objects or qualities of objects. This does not take into account either substance or causality, or even properly time or space. It only considers whether two given qualities are like or unlike, compatible or incompatible, unifiable or not in thought, and this gives rise to the notion of the class, to the judgment in Extension or Classification. Here we may be said to state the relation between two ideas, and to refer to, include in or exclude from, a class. These two forms of judgment, — the Comprehensive and Extensive, — are, logically considered, wholly independent of their actual or metaphysical relations; at the same time, they represent in a general and scientific form those various metaphysical relations, — are, in fact, fitted for thinking those relations, stated in their highest abstraction. It indicates simply a narrow, inadequate, and one-sided view, to represent logical judgment as founded on or expressing coexistence, or concomitance of attributes, or immediate succession, and to deny reference to a class, — as is done by Mill. Logical judgment is, on its real side or application to reality, as wide as the relations of things themselves, and that mainly because, while indifferent to special relations, it formulises all. It is a remarkable theory of judgment which, while limiting judgment to coexistence, and excluding inherence, would tell us that *three-sided figure* only coexists with *triangle*, or *extension* with *body*. And not less so would be the theory which implies that while consuming paper succeeds flame, the power of consuming is not a property inherent in flame.

(a) "In the judgment *A is a coward*, the combination of the notion of A with his deeds is the basis of the judgment; its subsumption under the notion of *cowardice* is the judgment proper. The logical element is the analytic subsumption of the less general subject-notion (or subject-conception) under the more general predicate notion." — (Bencke, in Ueberweg, *Logic*, p. 193.) The combination of A with his deeds is simply, to begin with, a judgment. Mere coexistence of A with his deeds, as in Mill's view, is no judgment. There might quite well co-exist in my mind the conceptions of *competent learning in metaphysical philosophy* and *Mr A B*; but I need not, therefore, think of combining them. Their coexistence and the attribution of the former to the latter might be to me wide as the poles asunder. When I combine A with certain deeds, and say that A is the author of them, I judge as much as when, having referred those deeds to the class *cowardly*, I predicate *cowardice* of A, and refer him to the class of cowards.

(b) Judgment with Hegel is equivalent to "the determination given to the notion by itself, or the notion making itself particular, or the original self-division of the notion into its moments with distinguishing reference of the individual to the universal, and the subsumption of the former under the latter, not as a mere operation of subjective thought, but as a universal form of all things."—(Ueberweg, *Logic*, p. 192.) Ueberweg's only objection to this is the confounding of reference to reality with reality. But the fundamental objections to such a statement are (1) the absurdity of hypostatising the notion, as yet a pure abstract without individual instance, and regarding this as capable of passing into the individual, confounded usually with the particular. (*This, that, with some of all.*) (2) The attribution to the notion *per se*, or notion in any way, the power of consciously passing into the individual, or the power of conscious process at all, which is competent only to a conscious subject cognisant of itself and difference. The notion, in fact, as a pure abstraction, is credited with all the attributes of a conscious subject or thinker. In other words, simply and ultimately because there is a (supposed) necessity of connection between notion and individual, this connection is hypostatized as a thing *per se*, and regarded as the universal in things; whereas it is and can only be, and be intelligible, in this or that individual consciousness, and thus subject to all its conditions. (For a fuller statement and examination of Hegel's theory of Judgment, see below, chapter xxii.)

CHAPTER XIX.

JUDGMENTS — SIMPLE OR CATEGORICAL AND COMPOSITE — THE CATEGORICAL—ITS ELEMENTS AND KINDS—AFFIRMATIVE AND NEGATIVE—UNIVERSAL, PARTICULAR, SINGULAR.

§ 296. Judgments considered as to the most general relation of subject and predicate are divided into Categorical or Simple, and Composite,—called also Conditional. When the predicate is referred to the subject simply or absolutely, that is, without contingency, we have the Categorical Judgment or Proposition,—as *A is B*; *A is not B*. When the judgment is contingent, and the statement is made under a condition or with an alternative, we have the Composite Judgment or Proposition,—*If A is, B is. A is either C or D*.

§ 297. Looking specially meanwhile to the Categorical, it is essential to a judgment, as already defined, that there should be subject, copula, and predicate, whether implicitly involved, or explicitly stated. In order to judge we must have that of which we predicate—the subject; we must have that which is predicated—the predicate; and we must have that by means of which we predicate, that is, affirm or deny,—the copula. Thus, *the sunset is lurid*; *the moon is bright*; *the temperature is 32°*. The Subject of a judgment was called *ὑποκείμενον*, *subjectum*; the Predicate *κατηγορούμενον*, *prædicatum*. A concept as predicable of a subject is, with Aristotle, *κατηγορήμα*; as actually predicated, *κατηγορούμενον*. The subject and predicate are naturally called the terms or limits of the Judgment (*ὅροι, ἄκρα, πέρας, termini*),¹ because it is within these that the predication,—affirmation or denial, is made. Thus, we may say,—*plant is organised. Plant is sub-*

¹ Hamilton, *Logic*, L. xiii.

ject; *organised*, predicate; *is*, copula. *Some marble is white.* A judgment expressed in words is a Proposition (*enunciatio, ἀπόφανσις*).

(a) There is sometimes the assertion of mere action, without definite reference to a subject which acts. *It rains, it snows, it thunders. There is rain, snow, thunder.* This is the first stage. Then there comes the definite subject; then the definite subject with reference to the specification and object. This is substantially the view of Schleiermacher and others.—(Cf. Ueberweg, *Logic*, p. 200.) It may be said there is no assertion of action without reference to a subject which acts, though there may be reference to a subject which we do not wholly know. When we say *it rains or snows*, we simply express a reference to the ultimate power beyond the sensible phenomena; but in so far as we regard this as the subject or cause of *rain or snow*, we regard it as a perfectly definite subject or cause. There is no such thing in human thought or experience as the apprehension or conception of an action or property without reference to a subject or substance, whether this be wholly known or not.

§ 298. The Subject of a proposition has sometimes been called the Minor Term; the Predicate the Major. This arises from considering one special kind of proposition, in which the subject is either species or individual. When I say *man is organised*, or *triangle is figure*, the subject term is less, understood as less, than the predicate. It is part at least of its sphere or *ambitus*. But there may be more, or the sphere of the predicate may be larger than that of which it is predicated. *Organised* is or may be wider than *man*; *figure* is or may be wider than *triangle*. Or if we say *Bucephalus is horse*, we have a predicate of which only a part is taken. But there are cases in which this distinction does not exist. Whenever the subject and predicate are substitutive, or convertible, there can in the proposition be no distinction of major or minor term. This at least is clear, that the extension of the predicate can never, in a true or competent predication, be less than that of the subject. In fact, this distinction of less and greater, of species and genus, is that expressed in the relation of subject and predicate in Universal Affirmative Propositions. The universal affirmative was usually regarded as *propositio potissima*. The relations of Minor and Major are most properly applicable when terms are compared in the syllogism.

§ 299. It ought to be noticed that a subject may be either *incomplex* or *complex*. The subject of which we speak may be *man, plant, mineral*. Or it may be grammatically a com-

plex expression, as, *to obey the law of truth is incumbent on every man*; or *to shun vice is a virtue*. Here the infinitive phrase is as much a term or subject as if it had been put in a single word. Logically these phrases, whether single terms or a plurality of words, indicate one concept, regarded as subject or predicate, as that whole of which something is said, or as that whole which is said of something.

§ 300. Terms and the parts of propositions are not given explicitly in ordinary language. The complex or irreflective expression is matter of analysis. If I say, *I walk, or leap, or run*, I express what I say in an implicit propositional form, and the science of logic has to ask me to make my meaning or mental act explicit in words. I must, therefore, resolve each expression into subject, copula, and predicate.

(a) Each proposition recognised by Aristotle represents a universal and invariable form of words, and a universal and invariable act of thinking,—the former apart from the particular words, the latter apart from the particular matter. Thus, the affirmative proposition is a synthesis by which we unite one representation to another. The words and the form of thought in one proposition may be used in all. The Categories of Kant represent the universal forms of thought. These functions of the understanding are united in a supreme act, the primordial fact of *pure apperception*. But while Aristotle considers the judgment to have a reference to existence and non-existence, Kant's expression, *objectivity*, has not a similar reference. This means merely the (fixed or universal) relations of knowledge, as the material is acted on by the Ego, and subsumed under the Categories. It is bringing, for one thing, the special under the universal; but the universal itself, with its relations and connections, is the product of the Ego,—the outcome of its activity. Aristotle's objective reference, if we may use the expression, was wholly different from this, which is simply subjective, though necessary.

(b) ὑποκείμενον with Aristotle has two grand meanings,—it indicates the subject of a judgment, and also the substance or substrate to actions in the nature of things. This was indifferently translated *subjectum* by the Latins, as by Boethius. ὑποκείμενον or object was translated by Boethius *oppositum*. Hence *subject* in the middle ages is equivalent to *substrate*, and so it is with Descartes and Spinoza. *Esse subjectivum* means with Occam that the thing in nature is placed beyond the mental species, and is not framed by thought alone. On the other hand, *esse objectivum* is that whose reality is known as a mental product or creation. *Objective reality* with Descartes is thus in modern language subjective or a representational notion. Kant and Fichte reverse this usage. The *subject* is he who knows; the *object* is the thing, as far indeed as it is subjected to the knower, and yet preserves its own nature free from the opinion of the knower. Hence it happens that that is

called *subjective* which lies in the varying condition of the knower, and that *objective* which lies in the constant nature of the thing itself. Wherefore if truth be defined the harmony of the subjective with the objective, nothing more is postulated than that the thing is simply thought as it is, and the cognition is adequate to the thing known.—(Trendelenburg, *Elementa Logices Aristoteleæ*, pp. 52, 53, ed. 1845. Compare *Descartes*, *English Translation*, *Appendix*, *Notes* iii. and vii.)

(c) *Κατηγορεῖν* is sometimes simply to say, at other times to prove by certain arguments, as with Plato in the *Theætetus*. In logic, *κατηγορούμενον* is the predicate, or principal predicate; *προσκατηγορούμενον*, or appredicate, is that which is placed to the predicate, or rather placed before it, that it may be enunciated of the subject—viz., *is*, since it has the force of a tie, and is not itself predicated. *Συγκατηγορούμενα* are those words which belong to the principal predicate—e.g., *Alexander is the son of Philip of Macedon*. Here *son* is the principal predicate; the other words are syncategorematic; *is* is not predicated, but it is the instrument and medium through whose intervention the predicate is attributed to the subject.—(Goclenius, *sub voce*.)

(d) The infinitive is very commonly the subject of a proposition. *It is a virtue to shun vice*. Here *to shun vice* is subject. The infinitive is, of course, simply a form of the noun, as containing merely the attribute indicated by the verb.

In the resolution of a proposition, grammatically considered, we may have various subjects and predicates, according to the emphasis or intention of the person employing the set of words. *I ought to love my neighbour*. This may be resolved: (a) *I* (subject) *am one who ought to love my neighbour*. (b) *To love my neighbour* (subject) *is my duty*. (c) *My duty* (subject) *is to love my neighbour*, &c.¹

In the case of a proposition referring to past time, as *Homer was a poet*, we may consider the element of time part of the predicate, or resolving the *was* into *is*, we can say *Homer is a poet*, or to be reckoned as a poet, and conversely *some poet is Homer*.²

§ 301. It is usual in logical treatises to consider judgments in respect of their Quantity, before treating of them in respect of their Quality. This seems to me to be an ill-grounded arrangement. The form of a judgment,—what is essential to it,—lies in the copula, and in the copula as marking inclusion or exclusion, attribution or non-attribution. Affirmation and negation, dependent on quality, as it is technically understood, are thus the essential characters of the judgment. We can have either the one or the other, while the subject is an indivisible unity, and does not admit of more or less in quantity. And it is not essential to affirmation or negation whether we take the subject, being a common term or concept, as in all its extent or in some. *All*

¹ Wallis, *Logica*, ii. 2.

² *Ibid*.

and *some* are indeed, in a sense, syncategorematic. Hence the relations of Quality ought to be considered before those of Quantity, in judgments. Predication, in truth, and the forms of it, lie at the very heart of judgment. And as expressed in language a proposition is always essentially a sentence indicative, not expressive merely of apprehension, or wish, or threat.

§ 302. Further, predication, as involving affirmation or negation, is a point antecedent wholly to the quality of truth or falsity in a judgment. It lies nearer to its nature or essence,—in fact makes it. A judgment can only be true or false, as it in the first instance affirms or denies. This is the strict logical presupposition of truth and falsity alike; and these are only possible as the judgment is a predication,—an inclusion or exclusion of a given subject and class, or an attribution or definite non-attribution of a quality to a subject. Hence it is a mistake to place, as Mill does, the truth or falsity of a proposition in the foreground. This is necessarily a property or result, because it is only possible through a full-formed judgment.¹ And we must know about the nature of the subject and predicate from intuition and actual conception, before we can pronounce on the truth or falsity of their synthesis or disjunction. In a word, the form of the proposition precedes, is independent of the matter; and can be legislated for apart from consideration of this altogether, though originally, no doubt, we were led to join or disjoin subject and predicate through the force of intuition and the conditions of actual conception, as we actually numbered or measured, before we thought of the pure relations of number or extension.

(a) Ueberweg makes judgment essentially consist in “a conscious reference to what actually exists, or, at least, to the objective phenomena. This gives the judgment its character of a *logical* function.”—(*Logic*, p. 188.) What has been already said shows that this is a secondary reference in strict logical judgment, and is possible only in and through the constitution of the judgment, for which logic legislates.

§ 303. A judgment (or proposition) is properly negative only when the negation affects the copula. The negation may be joined to the subject or to the predicate, while the proposition remains affirmative. *An animal which is not rational*

¹ Cf. Wallis, *Logica*, ii. 1.

is a brute; what is not an animal is not a man—or not-animal is not man. These are affirmative propositions, because the negation in no way affects the copula. We may say *not-animal is not man*. In this case the proposition is negative.¹

(a) In Latin the negative particle (*non*) is usually put before the substantive verb (*est*); in English it is put after it—*Non est, is not*.—(Wallis, *Logica*, ii. 3.)

(b) *Every man is not wise*. If this is taken distributively, then *no man is wise*. But if we say, *not every man is wise*, we leave it to be inferred that *some are or may be*. We do not absolutely negate.—(Wallis, *Log.*, iii. 2.) “*Not every one that saith unto me, Lord, Lord, shall enter into the kingdom of heaven.*”—(Matt. vii. 21.) This does not mean none who say so shall enter; but only some who so speak shall not.

§ 304. We ought to distinguish two degrees, or rather effects, of negation. In the first place, we may deny an attribute of a subject, as *the pine is not deciduous*. Here the subject still remains, although the attribute has been negated. And the subject may be either what we find actually to be, or what we suppose ideally may be, for the whole class *pine* is to us an object of thought, an ideal class. In the second place, our negation may be such that the subject itself does not survive the negation. If I say *a square circle does not exist*, or is an impossibility in thought and fact, or *there never was such a person as Presbyter John*, I abolish not merely all attributes, but I wholly sweep away the subject of the proposition. In the former case, the subject is but a form of words, with no unity of meaning or representation to begin with; and I assert this of the proposition. In the latter, the subject has a definite meaning; I do attach some conception to *Presbyter John*, but I sweep away the subject as a real existence.

§ 305. “*Non-homo* is not a noun, for none is constituted which can be applied to it. It is neither enunciation nor negation. Let it be an indefinite noun (*ὄνομα ἀόριστον*), because it can be equally predicated of every, whether what is or what is not.”—(De Int., c. ii.)

The *ὄνομα ἀόριστον* has only the form of affirmation. It really posits nothing; hence it has been translated by Boethius *nomen infinitum*. *The elephant is not man, is a finite or definite negative*. *The elephant is not-man means*

¹ Wallis, *Log.*, iii. 2.

that *the elephant is something which is not man* ; hence infinite, or better indefinite. To attach the negative particle to the predicate is an artificial form of expression.¹ In a proper negation, the negative belongs to the copula, or act of judgment.

(a) *Non-homo* is not said in reference to man only, but in reference to horse and dog, and goat, stag, and hippocentaur, and all things absolutely existing and non-existing.—(Ammonius Hermiæ, quoted by Trendelenburg, *in loco*.)

The elephant is something not man, or something which is not included under man as a class, or as a sum of attributes. If I know men, and the attributes of man, I know what does not belong to the elephant, or objects among which the elephant is not to be classed. But this does not tell me what attribute or attributes elephant possesses, or what objects it is like. So far as this affirmation is concerned, *elephant* might not possess life, sensation, locomotion, organisation, &c.—all these being in *man*. It tells me nothing, therefore, of *elephant* more than that as subject of a proposition it means something,—something conceived only, it may be, but I do not know *what* or *more*. If *elephant* as a simple concept be held as a subject defined, its attributes would be less than those of man, though in some respects congruent. To say it is *not-man* would be only to say that it is a concept having definite attributes, but less than those in the concept *man*. But obviously such a judgment would add nothing to our knowledge of *elephant* ; it would only negatively say what already we positively know of the subject. It would not even articulately develop what we knew. It would not amount even to an analytical judgment. The logical developments, or more properly manifestations of this form of the indefinite concept are founded on an essential misconception of the nature of negation, and a wholly artificial form of expression. Without a verb, says Aristotle, there is neither affirmation nor negation.

(b) The judgment ἀόριστον of Aristotle has been supposed to mean *unlimited* judgment (*unendliches Urtheil*), for although the predicate *non-homo* be excluded from one thing, there may remain a limitless space (sphere) of those things to which it may belong.—(Kant, *d. r. Vernunft*, p. 97.) But the judgment is properly *indefinite*, *Unbestimmtes*, not *unlimited*.

This interpretation supposes that the noun or subject concept is already defined, and hence may be found in the sphere outside man, or the infinite noun ; but as a defining judgment it is wholly indefinite.

Kant's third form of judgment, the Limitative or Infinite, is supposed to arise when the negation is connected with the predicate, not with the copula. But the essence of the form of judgment lies in the affirmative or negative copula ; and if the copula affirms the combination of the subject with the (negative) predicate, the judgment is affirmative. There is no real ground for the distinction of the limitative judgment from affirmative and negative judgments.

¹ Cf. Trendelenburg, *in loco*.

(c) Kant, again, divides judgments into three kinds—viz., Analytic, Synthetic *a posteriori*, Synthetic *a priori*. In the analytic judgment, the predicates state merely what is already contained, known to be contained, in the subject: in the synthetic, the predicates add something to our knowledge of the subject, founded either on experience (*a posteriori*), or on pure intuition of time and space, or pure concept of the understanding (*a priori*). With Kant, *a priori* is used to denote a knowledge independent of experience. If by that he meant wholly independent, there is no such knowledge and no such judgment. Experience as known, and intuition and concept of category as *a priori*, are inseparably related and inseparably given in experience, and so apprehended in one. The setting up of *a priori*, or pure intuition, or pure category, as a distinct kind of knowledge is, in itself, a meaningless process, and has been the source of endless aberration and fallacy. That there is an *a priori* synthesis, or synthetic act on occasion of experience, and in relation to experience, is true; that this is an imposition of the mind on experience, is false. It is simply experience itself revealing itself to the full reach of the cognitive faculty.

Again, the distinction of analytic and synthetic judgments of experience is relative, especially to the progress of knowledge. Unless we can get back to ultimate essence in each thing, we can never determine what is absolutely analytic in knowledge. And what is synthetic to-day may be analytic to-morrow, in the progress of science. Moreover, logically every predicate is analytic. It is explanatory of what is already conceived in the mind of the subject. It is explicit of the implicit.

Aristotle meant by *a priori* a knowledge of a thing through its cause or causes, which are prior in the order of nature; by *a posteriori*, a knowledge from effects which are posterior in the order of nature. As Ueberweg remarks, Kant's application of the Aristotelic phrases, and the consequent use of them, have done more harm than good in philosophy (*Logic*, p. 224). They have, in fact, led to verbalism, fantastic and lawless construction of systems and theories, which are neither applicable to experience, nor verifiable by it, or by any test competent to the knowledge of actual fact or reality.

§ 306. According to Quantity, Judgments (Propositions) are usually divided, since the time of Aristotle, into three classes, viz. :—

- (1.) Universal or General (προτάσεις αἱ καθόλου).
- (2.) Particular (προτάσεις μερικαί, αἱ ἐν μέρει).
- (3.) Individual or Singular (προτάσεις αἱ καθ' ἑκαστον, τὰ άτομα).¹

§ 307. Hamilton's principle of the division of Judgments is a simple one. Looking to the subject, Judgments, in his view, are either of a determinate quantity, according as their sphere is circumscribed, or of an indeterminate or indefinite

¹ *De Int.* c. 7; *An. Pr.* i. 2; and below, p. 255, for the Indefinite Proposition.

quantity, according as their sphere is uncircumscribed. The subject as a determinate quantity may be either a whole undivided (*all, every, the whole*); in this case we have a General or Universal Proposition. Or it may be an indivisible unity (*a proper name, this or that*); in this case we have a Singular or Individual Proposition. Further, the subject of the judgment may be an indeterminate quantity (*some*); in this case we have a Particular Proposition.¹ As examples of a Universal Proposition, we may take:—*All man is organised; all equilateral is equiangular; all A is B.* Of a Particular—*Some men are courageous; some men are white; some men are blind; some As are Bs.* Of a Singular or Individual—*Bacon was the author of the Novum Organum; this man was the thief.* In a Universal judgment the predicate refers to all of the subject, as:—*All A is B, or every A is B; all men are mortal; all plants are organised; no A is B; or any A is not B; any man is not a stone.* The subject is here taken in its compass or extension; of everything or all in or under the subject is the predicate affirmed or denied.

In a Particular judgment, the predicate refers to some part of the subject at least, as—*Some A is B; some A is not B; some man is learned; some man is not learned.* The subject of the particular judgment is *some at least, one at least*, of the class. We may add on to this others, until we come to *all* of the class. *Some at least* means *some one certainly, possibly all*. The particular, therefore, provides for the possibility of the universal.

In an Individual judgment the subject is an indivisible unit, as a person or individual object. Thus *Aristotle is a philosopher*. Here *philosopher* is predicated of *Aristotle* in its whole extent, that is, as one or the minimum of extension. Nor can the subject be less, without changing or destroying it. The individual subject may be indicated in language by a proper name, as *Virgil*, or, *ex hypothesi*, as *the Bard of Mantua*, or *the author of the Æneid*; or *this man*.² The essential part of the individual representation is its determinateness, or definite totality.

§ 308. An Individual judgment is thus distinguished from a subject, which is a common concept or term, by this, that the common term may be a particular subject, and yet not

¹ *Logic*, L. xiii.

² *Wallis*, II. 4.

cease to indicate the class for which it stands, as *some men are learned*; whereas the individual subject or term, if lessened in extension, would no longer represent the individual. The predication must always be of the whole. Aristotle does not include under the head of particular the individual or singular. The one is *κατὰ μέρος*, the other *ἄτομος*.

§ 309. The individual may be constituted by a unity of aggregation, as *this heap of stones*; or by organisation, as *this man, this tree*.

The individual may be further constituted collectively into one subject, so that the predicate refers to the whole of it, and not to each of the parts,—as, *all the planets are eight*; *all the apostles are twelve*. In *all the planets are stars*—that is, *every planet is a star*; *all the apostles were called*—that is, *every apostle was called*; the predicate refers to each. The universality in the former case is that of Definite Omnitudo; in the latter that of Complete Distribution.

(a) Herbert's view of the individual judgment is that it is to be regarded as universal only when the subject is distinctly marked. *A man, a tree, a house*, is to be taken as indicating a particular judgment, that is, *some or one out of all*. But *a* or *an* may equally well indicate *any one*, and therefore *all*.

§ 310. Logicians, following Aristotle, have set up as a fourth class of judgments, rather propositions, what is called the Indefinite. The subject of such a proposition has no mark of quantity, neither all nor some, and it is thus left indefinite in expression. Propositions of this sort have been called *προτάσεις ἀδιόριστοι, ἀπροσδιόριστοι*.

Hamilton prefers to call them *preindesignate*, that is, lacking the mark of quantity.

There is, properly speaking, no indefinite or mentally indesignate subject, and therefore no indefinite judgment. When we speak of a subject, we are supposed to know that the predicate applies either to the whole of it or to a part of it at least. If the former, the subject is mentally definite or universal; if the latter, the subject is particular. As we cannot reasonably speak at all of a subject unless we know that the predicate applies to some at least of it, our proposition must always mean this much. To leave the subject unmarked in expression is thus an accident or inaccuracy of language, and does not constitute a ground for a separate

class of judgments. When we omit the mark of quantity in the subject, we do so either for the sake of abbreviation of speech in ordinary usage, or because the subject is well understood to be taken universally, or because it is not necessary for the purpose of the statement that the proposition should be more than particular. In the case of the subject being a singular term or indicating an individual, no mark of quantity is needed. It is taken as an indivisible unity.

(a) The marks of universality are:—*All, every, the whole, each, both, both one and the other, none not, nobody, neither, always, everywhere, &c.*

The marks of particularity are:—*Some one, somebody, any one, something, or some one at least; not none, several, few, not-nobody, one, two, three; some not, not all, at some time, somewhere, &c.*

(b) These signs are more explicit in Latin and Greek than in English. For universal signs we have *omnis*, which is equivalent to *every, all*, the distributive whole, and also to the collective. *Totus* means *all, the whole*, the completed class or collective whole; and so does *cunctus*. Other signs indicate the whole from the point of view of *one or every one, each*, as *ἕκαστος, unusquisque, singuli*.

Every and *each* both refer to one selected, but *every* to one selected out of a whole definite,—*every one of the men was drowned; every one of hoofed animals ruminates*. *Each* refers to one selected out of *several or many, or two*. *Each of them got a shilling; or each of the two was killed in turn*. The effect of *every* and *each* is to concentrate attention on *one* or a *unit* of a more or less definite whole.

The Greek *πᾶς* indicates all, and this either (a) of one—the *whole entire*—that is, Definite Individuality; (b) of several, *every, in plural all*. *ὅλος* is equivalent to the former of these meanings. *Πᾶς τις* means *every one* taken one by one, *every single one*. *Quisquis, quicumque* (*whoever, whatever*), implicitly mean *all, every one*.

Adverbial signs of universality are *omnino, prorsus, semper, ubique, undique, &c.*

Of particles of quantification in Particulars, we have in Latin chiefly *Quis, Aliquis, Quidam*. *Quis* means *some* (very indefinitely), *some at least, any one, somebody, &c.* It does not even imply actual existence, and hence is used in conditional clauses with *si, nisi, &c.* *Aliquis* means *some one, somebody, any one, &c.*,—that is, *not-none*, but with no reference to its kind or individuality. It is *any one*, as opposed to a *certain one*. *Quidam* means *some one, a certain one*, whom I know, but do not choose or need farther to specialise. In the plural, *quidam* would seem to mean *some of a definite class*, as opposed to others of the same class. *Excesserunt urbe quidam, alii mortem sibi consciverunt*. The *some* here refers to one part of a definite class—those in the city—at the time. There is *some or other* (or *not-some*) of the same class. *Nonnullus* is *some or several at least*—as *nonnulla pars militum*. *Nonnulli, some*.

The distinction of *quidam* and *aliquis* is important as bearing on the legitimacy of the Negative proposition with a particular predicate,—

some is not some (In I), noticed below. *Quidam* means *some one*, yet a certain one whom I know or have in mind, though I may not choose to specify him. In *quidam vestrum me vocavit*, it means one whom I know. *Aliquis* would mean *some one* whom I do not necessarily know. *Quidam* thus means *one only*, or a definite one, and implies not the other one or other of you. As Valla puts it, *quidam* is *biparticularis*,—that is, it is both affirmative and negative. *Aliquis, quisquam, quispiam*, may be taken as particulars of the universal *quisquis* (*whoever, whatever, &c.*) Adverbial particular signs are *unquam, usquam, uspiam, aliquando, alicubi, alicunde, &c.* *Quidam*, in fact, is singular in meaning rather than particular.

In Greek, *τις*, masculine and feminine, *one, any one, some one*; equivalent sometimes to our *a, an*; neuter, *anything, something*.

Like *ἕκαστος* or *ἕκασ*, it means *each, each one, every one*. Hence starting from the individual, and running through the class, it may stand, like *aliquis*, as particular or universal.

In negatives, we have as universal signs *nullus*—that is, *ne ullus*—*ne ullus quidem, not one, not even one, none, not any*. Similarly in Greek we have *οὐδὲς* and *μηδὲς*. With all the Aristotelic commentators, the subject of the Particular negative is not taken as *τινὲς οὐ*, but as *οὐ τῶς*.—(See Philoponus on Scheme of First Figure.) *Nullus currit, i.e., ullus non currit. Elephanto belluarum nulla prudentior. Ullus*, used almost exclusively in negatives, is *unulus*, from *unus*; as meaning *one, any one*, it is properly universal. *Neguis* (*ne aliquis*) is *not even some one*, that is, *none*—so universal. *Nihil, nihilum, nothing* (*nihil non, everything; non nihil, something*). *Nemo* (*ne homo*), *no man, no one* (*nemo non, every one; non nemo, many a one*). Adverbial negative signs are *nunquam, nuspiam, &c.* *Aliquis*, as other particulars, with negation is commonly a universal. *Aliquis non est me fortunator, quisquam non est te melior, ullus non est illo modestior*—that is, *nemo, no one*. We should not use *quidam* in those instances—that is, *a certain one*—for we really mean *any one whatever*. Particulars as a rule, when they receive a negation, become universal.—(Cf. Laurentius Valla, *Dial.* L. ii. c. xxviii.)

Singular signs are *hic, ille, iste, meus, tuus, &c.*, and proper names; also adverbs of time, as *nunc, cras, tunc, &c.*—(On this point see especially Valla, *Dialectica*, L. ii. cap. xxv. et seq.)

§ 311. Indefinite propositions can only be enunciated where the subject is a common term, and capable thus of being taken universally or particularly. Propositions whose subject is singular or individual are necessarily taken universally, or definitely of the whole subject, as *Homer was an epic poet; Plato was the author of the Republic*.

(a) It has been laid down as a rule that the indefinite (or indesignate) is when affirmative universal, and when negative particular. This is not absolutely trustworthy.

(b) It is not correct to maintain, as Ueberweg does, that in indefinites,

when the subject is a general notion (e.g., *a man*, or *a great general*), the proposition is to be regarded as particular, or "that the subject is to be taken as an indefinite part of the sphere of the subject-notion."—(*Logic*, p. 214.) It must be so taken at least, but more may be meant and mentally asserted, more may be assumed in reasoning upon the proposition. The subject may in such cases quite well be a universal.

In Greek the article has the force of *all* in universals. ὁ ἄνθρωπος ζῶον means *man is animal*, and *all man is animal* (πᾶς ἄνθρωπος ζῶον). The article has the power of universal determination (præfinition), (τοῦ καθόλου προσδιορισμοῦ). But the article agrees to the unifying of the universal subject; wherefore it is conjoined to each of singulars (μοναδικῶν) and of individuals (ἀτόμων), for we say ὁ ἥλιος (the sun) and ὁ Σωκράτης (Socrates), and sometimes we apply to what is excellent amid the like, as when we say, ὁ ποιητής (the poet), ὁ ῥήτωρ (the orator).—(Ammonius Hermiae, *M. De Int.* f. 67^b; *Latine*, p. 108—cf. pp. 118, 188, 299, 300. Ed. Venetiis: 1549.) The force of the Greek article, therefore, is twofold: (1.) To render the noun universal, to gather up the individuals of the class into a whole—that is, to render the concept universal, and therefore definitely general; (2.) To mark in singulars and individuals their definitude as such, and thus to individualise, or render the noun definitely individual.—This testimony of expression goes to confirm the logical accuracy of the classifying of the universal and the singular under the common head of the Definite. We have other examples of the power of the article to render definite, or to mark precise determination in the case of abstract nouns in which the unity or completeness of the attribute is indicated by the prefixing of the article, as ἡ ἀρετή, ἡ διάνοια.

So ὁ σὸς υἱὸς means *thy son*—that is, one definite one; while υἱὸς σου means *any one of thy sons*; τὸ πολιτικὸν means *the citizens* as a body; τὸ βαρβαρικὸν, the barbarians taken collectively; οἱ θνητοὶ means *the class*; θνητοὶ, mortals, *some at least*, though it may mean the whole class; οὗτος ἐστὶ ὁ Μένιππος means *this is the distinguished Menippus*; φίλους ποιεῖσθαι means *to make friends*,—that is, *some indefinitely*; τοὺς φίλους ποιεῖσθαι, means *to make the friends* spoken of.

So in German, when we speak of the class (definitely), the article is prefixed, as *das Metall ist nützlich*—metal (that is, the class) is useful. *Die Stadt*, the town, indicates definitely the single or individual town. *Das Brod*, bread, the class; *ein Brod*, a loaf.

In English the usage is rather the other way. *The man* would mean the individual; whereas *der Mensch* means the class man. But if we say *the dog*, *the cat*, &c., we generally mean the class.

In French the articles show whether a subject is taken universally (definitely) or particularly. When we say *l'homme est capable de bien et de mal*, we mean *tous les hommes*, or the whole or class. As in Greek, the article is prefixed to abstract nouns, as *la beauté*, *le courage*, &c. This has the effect of individualising, and yet indicates the universal quality in all of the class. So long as there is no express restriction, the term is understood universally.—(Cf. Delarivière, *Nouvelle Logique Classique*, § 580-1.)

§ 312. Judgments considered according to Quantity and Quality are usually divided into four kinds:—

A. Universal affirmative—*All A is B.*

E. Universal negative—*No A is B.*

I. Particular affirmative—*Some A is B.*

O. Particular negative—*Some A is not B.*

Asserit A, negat E, sunt universaliter ambæ;

Asserit I, negat O, sunt particulariter ambæ.

In those forms, the subject in universals, whether affirmative or negative, is taken in its whole extent, or distributively; in particulars, in part of its extent. The predicate in affirmatives, whether universal or particular, is held to be taken in part of its extent, only, or at least; in negatives, whether universal or particular, the predicate is held to be taken in the whole of its extent. This classification of judgments, accordingly, must be regarded as referring to their extension only, and we shall consider below what modifications and additions require to be made to it.

(α) Aristotle's test of the universal (τὸ δὲ καθόλου) is that it may be predicated of many (*De Int.*, c. vii.); of the singular (καθ' ἑκάστων) that it cannot be so predicated. In *Met.*, iii. 4, he says the individual is that which is one in number. *Man* is a universal; *Callias* is a singular.

As a proposition is an enunciation affirmative or negative, it is either universal, particular (ἐν μέρει), or indefinite (ἀδιόριστος). I call the universal, says Aristotle, the being present (ὑπάρχειν) with all or with none; the particular, the being present with some, or not with some, or not with all; indefinite, the being or not being present, the mark of the whole, or the part being omitted, as *the knowledge of opposites is one, or pleasure is not a good.*—(*An. Pr.*, i. 2.)

(β) ὑπάρχειν, with Aristotle, means that what is in the nature of the thing may be predicated in enunciation of the thing as subject. Predication would thus be opposed to arbitrary mental creation, and would be an expression of reality.—(Cf. Trendelenburg, *El.*, § 6.)

ὑπάρχειν is held to have two meanings—

(1.) One in which the predicate is said to be in the subject, as *all B is A*,—*A is predicated of every B.*

(2.) One in which the subject is said to be in the predicate, as *all A is B*,—*A is in the whole B.* This is said to be the reverse of the former.

Every B is A, means every one, hence all,—omnitudo. *A is predicated of every one of the subject*, taken distributively. *A is in the whole (of) B*, means in the totality represented by B as subject. Hamilton's view, however, of the statement (in *An. Pr.*, i. 1) is that it is

"the preliminary explanation of the two ordinary modes of stating a proposition, subsequently used by Aristotle. In both convertibles he descends from extension to comprehension, from the predicate to the subject."—(*Log.*, iv. 302.)

(c) Universal and particular are taken relatively. The universal may be predicated of many, and yet be itself a part of a wider notion. The genus which comprehends individuals may be a species of a higher genus,—as *man*, *Callias*, *animated*.

The universal is more excellent than the particular. Thus of two propositions, he who holds the prior (the universal), also, in a certain manner, knows the posterior; as if any one knows that every triangle has angles equal to two right, in a certain manner also he potentially knows this of an isosceles triangle, even although he does not know that the isosceles is a triangle. But he who knows the other proposition [the particular] in no way holds the universal, either in faculty or in act. Further, the universal proposition is apprehended by the intellect alone; the particular falls under the sense.—(*An. Post.*, i. 24.)

There are three classes of objects of thought, according to Aristotle.

(1.) Some things are such that they cannot be universally predicated of any other thing, as *Cleon*, *Callias*, the singular thing, and the object of sense alone,—the percept. These are properly only subjects.

(2.) But of such subjects there are things which may be universally predicated, as *man*, *animated*. These express the genus or general nature of the subject.

(3.) There are notions which may be predicated of others, but of them nothing prior or higher can be predicated. These are *summa genera*, to which nothing is prior and more universal, so that there is nothing which can be predicated of them. If *being* or *unity* be attributed to these, this, according to Aristotle, is not true predication. *Being* and *unity* are only true predicates when they define the singular, by itself indefinite.—(*An. Pr.*, i. 27, and Trendelenburg, *in loco*.)

In the *Categories*, c. 2, Aristotle says that "individuals, and all that is numerically one, cannot be said (predicated) of any subject. But nothing prevents these being sometimes in a subject; for example, grammar is one of the things which are in a subject, and yet it is not predicated of any subject." But, as Hamilton remarks, this is refuted by the admitted reciprocation of the singular.—(*An. Pr.*, ii. 23, § 4.) "Let A be *long-lived*, B *that which has no gall*, and C *all long-lived animals*, as *man*, *horse*, *mule*, &c. Then A is in all C, for all C is *long-lived*; but B also, *that which has no bile*, is in all C; if, then, C is reciprocal to B, and does not extend beyond the middle, A must be in B."—(Cf. *Logic*, iv. p. 301.)

(4.) Aristotle hesitates as to whether what were afterwards known as transcendent notions are to be regarded as universals.—(*Met.*, iii. cc. 3, 4; *Eth.*, i. c. 6; *Met.*, iv. c. 2.) *Being*, *thing*, *something*, are transcendent; *animal*, *virtue*, *colour*, *figure*, &c., are determinate and circumscribed by certain limits of predication. The former are universal in the sense of being applicable to a plurality of objects; but they are not so universal or applicable in so precise a signification as the determinate concepts.—(Cf. Mark Duncan, *Inst. Log.*, i. 2; Salmurii, 1612.)

CHAPTER XX.

OF MODALITY IN PROPOSITIONS.

§ 313. When the predicate is said of the subject barely or merely, as by *is* or *is not*, we have a pure, simple, absolute, or categorical proposition, that is, one merely assertory. When the proposition is wholly resolvable into its three logical elements,—subject, copula, predicate,—we have this kind of proposition, as *A is B*, *A is not B*, *the sun shines*, *bodies gravitate*. When, however, the proposition contains a *modification* or *qualification*, which affects the copula, we have what is called a Modal Proposition. *It is certain that A is B*. *It is believed that A is not B*. *It is perhaps true that C killed D*. *It is impossible that he can run over the ground in that time*.

Some modes of propositions appear to strengthen the statement; others to lessen its effect, or the effect of a simple assertion. *It is certain*, *absolutely certain*, *above doubt*, &c., may be taken as intensifying the assertion. *Perhaps*, *it seems*, *it may be*, &c., may be regarded as diminishing the force of the simple statement. At the same time, the simple unqualified statement conveyed by *is* or *is not*, really often conveys a higher sense of assurance on the part of the speaker, than the use of epithets implying absolute certainty, or the absence of doubt. These epithets rather suggest an attempt to suppress doubt in the mind of the writer or speaker.¹ In the language of the older and more exact logicians, Modal Enunciation consists of the Dictum and Mode. The Dictum corresponds to the subject, the Mode to the Predicate of a Pure Enunciation. The Dictum is an expression consisting of the case of the noun and the verb of

¹ Cf. Wallis, *Logica*, ii. 8.

the infinitive mood, as *Hominem esse animal necesse est*. Here the Dictum is *hominem esse animal*; the Mode, *necesse est*. The Mode, it is added, is not the attribute in the Modal Enunciation, and the Dictum is not the subject, but correspond proportionally to the attribute and subject in the pure proposition.¹

§ 314. The so-called modality of a proposition in many cases depends on the use of the adverb, and its natural expression of an attribute, and an attribute usually of the verb, or it may be adjective. We may happen to express in language an attribute which is one only of the complex attributes expressed by the predicate; but thus to regard our proposition as essentially different from the simple or assertory, would be the merest bowing down before the husk, the accident of expression, and worthy only of the weakest nominalism. Whenever the mode is in the form of the adverb, it is resolvable into an attribute of the predicate. *This man was justly convicted*, is readily resolved into a case of *just conviction*, and so with all ordinary adverbial phrases or clauses. Proper logical modality affects the cohesion of subject and predicate alone.

(a) Every proposition expresses either that the subject is in the predicate, or is in it necessarily, or may be in it.—(*An. Pr.*, i. 2.) The first is the absolute proposition, the *propositio pura* of the schoolmen. It is called *categorical* by Kant and others; but *categorical* with Aristotle means the universal affirmative proposition or simply the affirmative proposition. Under the necessary, Aristotle comprehends the impossible, under the contingent the possible.—(St Hilaire, *in loco*.)

The terms *modal* and *modality* are due to the commentators, not to Aristotle; and they are akin to the grammatical moods of the verb. With Aristotle, mood (*τρόπος*), primarily and properly, means any adverbial qualification, as *swiftly*, *beautifully*, *always*, &c., and hence mood came to mean the most general classes of those qualifications, especially *necessity*, *possibility*, *contingency*, *impossibility*. Boethius translated *τρόπος* by *modus*, borrowing it probably from the grammarians.

The corresponding modern names are Assertory, Apodictic, Problematic. The *τὸ ἐνδεχόμενον* of Aristotle was translated by Boethius *contingens*, i.e., in which the issue is such that whether it may or may not take place, is left undecided. The other meaning of *contingent* is that which is, but is opposed to what is necessary.—(Cf. Trandelenburg, *in loco*.) Properly the possible is that which is not, and might be; the contingent is that which is, and might not be. Aristotle has

¹ Cf. Duncan, *Inst. Log.*, L. ii. c. ii. § 4; and Wallis, *Log.*, L. ii. § 1.

distinctly noted these two meanings, but apparently uses them without always discriminating them.—(Cf. Zabarella, *In De Int.*, c. 12.) It is clear that the modality of a proposition, as such, depends wholly on the form of the copula. As Vives has well said, those propositions to which the mode is added have not a dialectical but a grammatical significance.—(Cf. Mark Duncan, *Inst. Log.*, L. ii. c. 2, § 4.)

§ 315. Logicians who have admitted modality into the science have usually contented themselves, though illegitimately, with recognising four kinds—viz., Necessity, Contingency, Possibility, Impossibility. By Necessity is meant that the thing or subject spoken of cannot be otherwise; by Contingency it is, but it might have been otherwise; by Possibility it is not, but may be; by Impossibility it cannot be, it is against the nature of the thing.

Of Necessity, such an example as this may be given; *animal* [is *sentient*, that is, *sentient* is of the essence of *animal*. It belongs to *animal*, and this cannot be otherwise.

Of Impossibility, the example may be given, *man is not a stone*. Man being sensitive, he cannot be stone.

Of Possibility, *Aristotle might have been a king*, though he was not.

Of Contingency,—*Alexander was a king*, and *Aristotle was a philosopher*. Such things were so, but they might have been otherwise.

(a) Kant joins together Possibility and Impossibility, Existence and non-Existence, Necessity and Accidentality or Contingency. But the impossible has no proper relation to the problematic. What is impossible is *what cannot be*; and the statement is given in a negative judgment, necessarily negative or apodictic. *A cannot be B. Of necessity, no A is any B.*

Again, the accidental or contingent, *what is, but may not be*, or *might not be*, is assertory, and ought not to be coupled with what is necessary, or *what must be*, that is, with what is apodictic.—(Cf. *Überweg, Logic*, p. 208.)

§ 316. Obviously there is no necessity in *sentient* as an attribute of *animal*. There is the simple fact that such a feature is a part of the concept *animal*, and that this is warranted by experience; and further, that it is in all animals, or a property of the class. But a necessity of thought there is not in this case, nor in any case of generalisation from experience. We find certain objects distinguished by this feature, and we, therefore, classify them as one, or of the

same kind. But we do so simply on the ground of a constant or never-failing experience; and the feature becomes essential to any individual object to which we give the class name, because we have already fixed on it as part of the concept, for reasons sufficient or insufficient. But necessity of thought there is none, only constancy or uniformity of experience. So with *consuming paper* as a feature of *fire*, so with a stone falling to the ground when thrown into the air. All is matter simply of experience, and our concepts are, as to their constitution, relative to given experience. The essence, or essential features of a concept, are first of all determined, and then, of course, it is necessary that the object classifiable under it should possess the corresponding essence or sum of features. But this is a purely hypothetical necessity; and in no way makes the concept itself a necessity of thought, however well founded as a generalisation from experience.

Impossibility has as little reference to the facts of experience. It is, in truth, merely the converse or negative of necessity. It is necessity that a thing should not be in such and such a manner. But so far as our ordinary and scientific knowledge go, we have no such necessity. To logical law, numbers, relations of space, even to metaphysical law, impossibility of conception distinctly applies; but it stops there. There is no impossibility in conceiving the reverse of any purely physical law or relation of things. As applied to ordinary thought, it is a mere confusion of universal negation with proper impossibility.

§ 317. Necessity as applied to propositions of experience, ordinary or scientific, means only universal affirmation; and this, run back to its elements, is grounded mainly on scientific induction. It is equivalent, in fact, to the universal affirmative of the logical treatises. Impossibility, in the same relations, may be fairly translated into Universal Negation. Thus *A is necessarily B*—i.e., *all A is B*. *It is impossible that A can be B*—i.e., *no A is B*.

Contingency has the same references as possibility. *Plato was a philosopher*, but might have been something else. *Some of the As are Bs*, but they might have been otherwise. *Some men are prudent, all the men in the ship were drowned*. The cases of Possibility are obviously instances of hypotheses, or propositions to be tested by material evidence, and thus do not

fall within Pure Logic. Contingency is wholly extra-logical, and depends on our view of the nature of reality and its relations. Possibility and Contingency may apply to the individual subject, to the particular, or even universal.

Possibility—*This city may possibly be ruined by an earthquake. The Pretender might possibly have been a King. Some of the sailors may have been drowned. All of the As may be Bs.*

§ 318. The true view of the modal proposition is that which makes what is called the *dictum*, or subordinate proposition, the subject of the whole proposition, and the *mode*, whether necessary, possible, or contingent, the predicate of the dictum. In this way every modal proposition really becomes a singular, either affirmative or negative. Thus, *it is possible that all metals are electrical*, in other words, this definite proposition, *all metals are electrical*, is one of our possible conceptions or propositions. There is here, properly speaking, no question of whether the proposition (subject) is true or false. The reference is wholly to its possible verification.

So in the case of a particular affirmative dictum, as *it may be that some men are rogues* or *red-coloured*. The *some men are rogues* or *some men are red-coloured* is the subject, and the predicate of contingency is affirmed of it. Here the subject is one definite individual statement. *It is not possible, it is not contingent, it is not necessary*,—these would indicate singular negative propositions.¹ It is of no consequence to the definiteness or individuality of the proposition, taken as subject, whether it be of universal or particular quantity. It is regarded simply as a complete or integral statement or proposition. The subject and predicate are to be regarded merely as simple terms, seeing that they indicate one simple definite conception.

Modality is wholly indefinite, in fact, infinite. And there is no reason whatever why, if any modality is admitted in Logic, all may not. Thus we might take anything in the form of a proposition as the dictum—anything, in fact, which the indefinitude of expression might afford or the licence of fancy suppose. Then the modes might be as varied, and we should have every indirect form of speech, evasive or suggestive phraseology, possible in rhetoric or language, to consider, and all this, forsooth, that Logic may be expanded to the neces-

¹ Cf. Wallis, *Logica*, ii. 8.

sities of what is called human thought or experience,—an expression which is made to stand for accurate thinking and discrimination of points that differ. All modal expressions are, in fact, syncategorematic, and wholly external to the true nature of the proposition, of which even they form part.

§ 319. But what is necessity? On what ground is a proposition necessary? Is there more than one kind of necessity? These questions require to be answered in regard to the first form of modality. What branch of philosophy is to give the answers? Clearly that which deals with the nature, origin, guarantee of human knowledge. But this is obviously, at least, a very different science, or series of sciences, from that which deals with the nature and relations of concepts in every matter, judgments of every kind, and propositions in every form of reasoning.

As to the possible,—that which may or may not issue,—what is to be our test of this? Clearly something in the character of the matter or cause, something, therefore, to be determined by observation and induction. The possible may depend on a law or rule of doubtful application, on a converging series of causes, whose total result we cannot beforehand predict with certainty. Is it seriously maintained that an inquiry into principles which would help us to regulate knowledge or anticipation of this sort, is to be classed with the laws which regulate actual and possible conception, judgment, and reasoning? We should thus require to have recourse not only to the whole rules of Induction, but to those of the estimate of Proof. And if the conclusiveness of our inference from the proposition were to depend on its character as contingent, this would be paralysed in a thousand cases, and never be absolutely strict in any. At any rate, we should be driven to a set of inquiries wholly foreign to the precise and useful rules of consistent and connected thinking, with the prospect only of indefinite delay. To reproach the Science of Formal or Deductive Logic for not taking into account the modality of propositions, is utterly beside the point and futile, just as much so as to say that Geometry does not tell you of the particular spaces it can measure, or Arithmetic the properties of the things, pears, apples, or cherries, which it can help you to number.

(a) Aristotle said, *πάντα πρότερον ἔστιν ἢ τοῦ ἐνδέχου ἢ τοῦ ἐξ ἀνάγκης*

ὑπόρχεω ἢ τοῦ ἐνδέχεσθαι ὑπόρχεω.—(*An. Pr.*, i. 2.). From this hint logicians have worked out modal judgments; and though it may be said that Aristotle's statement refers to the relations of existence or actuality, this may readily further be taken as the ground of the various degrees of certainty regarded as represented by modal judgments.

According to Ueberweg, the notion of affirmation is "the consciousness of the agreement of the combination of conceptions with actual existence; the notion of negation, "the consciousness of the want of agreement of the combination of conceptions with actual existence." According to modality, "the judgment is problematic, assertory, or apodictic. Its problematic character lies in the uncertainty of coming to a decision upon the agreement of the combination of conceptions with actual existence. Its assertory character lies in the immediate certainty (based on one's own or another's perception); and its apodictic character in the mediately acquired (based on demonstration, ἀπόδειξις) certainty of coming to such decision."—(*Logic*, p. 206.) From what I have already said, it is, I think, clear that no one science, call it Logic or anything else, could possibly deal with all the grounds on which such judgments ought to be made, even as with a view simply to specify the conditions, laws, and methods of determining matter of fact, what only may be, what cannot be, what must be. This would be the most heterogeneous science conceivable, or a series of logics of the most varying order. One's own perception is the basis in some cases; "authentic witness" in others; inference, necessary inference, from another judgment. How can these be discussed from a single point of view? Or how can they be discussed at all, apart from the whole range of Mental Philosophy?

Δύνασθαι (to be capable), in the Aristotelic use, may be taken as meaning possibility in the sense of the existence of the cause, and thus of its possible operation, as a matter of fact. The seed is capable of developing into the plant; the plant is capable of flowering; ἐνδέχεσθαι may be taken as meaning the absence of hindering or hostile circumstances, in other words, causes that might frustrate the possible (natural) effect, as frost in respect to the seed in the earth. Hindering circumstances may further be represented by the absence of concauses, as apart from moisture, air, suitable soil, &c., the seed will not develop into what is potentially in it. These concauses, sometimes called conditions, are truly parts or elements of the cause, which is generally the sum of concauses.—(On this point cf. Waitz, *Ory.*, i. 376, and Ueberweg, *Logic*, p. 208 *et seq.*) Supposing the sum of concauses or the cause to be present, and there being no counteracting cause, the effect will follow with necessity, that is, hypothetical necessity, or uniformly without exception. There is, however, even here no true logical or even metaphysical necessity.

In an Assertory Judgment, the certainty is said to depend on the correspondence between the judgment and our observation or generalisation of facts, as 'bodies gravitate.' *All the planets move with the sun in space. Some A is B.* This refers to what is known as a matter of fact. But there is really no true distinction in respect of generalisations from

experience between assertory and problematic judgments. The assertory judgment *all bodies gravitate* is not a matter of past experience, it is not even a matter of fact. It is a matter partly of fact and partly of objective possibility, or probability, and therefore of belief. *Some bodies have been found to gravitate; all bodies will or may gravitate.* This latter proposition is not strictly assertory; it is a problematic proposition, with the highest degree of subjective certainty. It is a description of the state of my knowledge or assurance regarding fact, rather than of fact itself. *It is my belief that all bodies will or can gravitate*, is the true form of the universal assertory judgment, and it is simply a modification of the problematic.

Then the Problematic Judgment has no proper place by itself. It, too, describes a state of my knowledge or a limited degree of assurance regarding fact. *It is the case or I know that this event can happen*, either because I know the sum of its concauses exist, or more slightly still, because I do not know anything that can prevent it happening. *This seed can or may grow into a tree,—this person may commit suicide*; either because there is nothing to hinder the one, or it is in the power of the person to do what I suppose possible. But this indicates merely a state of limited certainty or expectancy on my part. The subject of the judgment, if it can be so called, is not primarily, as in the assertory judgment, *the seed or the person* spoken of, but the state of my mind is such that I believe that the seed can grow, or the person destroy himself. The problematic judgment is simply the statement of a hypothesis which is not itself a judgment but a conception. As far as the problematic judgment is one, it is simply assertory. The problem is merely a stage on the way to judgment proper, in which quite different terms will appear, for we shall then be able to say, *the seed has become a tree*,—not, *it is my belief that it may*.

The Apodictic Judgment has no better title to be considered as a separate form. It, too, refers to the degree of certainty or assurance, and is properly expressed in the assertory form—*it is the case, or I know or believe that A must follow B*. In the first place, *must* here is ambiguous. It may refer to a mere physical sequence, in which *must* simply represents unexceptional uniformity, as, *all bodies must gravitate*; or to a sequence, metaphysical or other, in which *must* is strictly taken as representing a relation the reverse of which is inconceivable, as, *this change has a cause*; $5 + 5 = 10$; *all the angles of a triangle are equal to two right angles*; *nothing is less than something*; *one is not none*. In the former case there is no necessity, that is, absolute necessity, in the sequence. There is simply the high, very high, certainty which attends a sound generalisation from experience; and this in its universality is always only problematical, only relative to grounds of belief, the actual facts not having, from the nature of the case, happened.

In the latter case, the judgment is simply assertory of a state of my knowledge or belief, or of a condition of my knowledge. *A change has a cause, and I know it must have a cause*, for the reason that I cannot think it otherwise; $2 + 2 = 4$, for the reason I cannot conceive the sum any more or less. The objective necessity lies properly in the

matter of the judgment, or in that about which I think. I express the state of mind produced by this necessity by *must*, as I might express a generalisation from experience by *will*, or an objective possibility by *may* or *can*; but all these are properly distinctions arising from the matter or application of the complex subject or predicate, which is really *change having a cause, all bodies gravitating, this seed growing*. These refer to degrees of my knowledge, founded no doubt on objective fact, but none the less capable of being stated in a plainly assertory form.

That the simple assertion is the essential and only necessary thing, is proved by the fact that it alone is sufficient to guarantee a necessity of inference. *All A is B, all C is A, all C is B*, is as valid as *all A must be B, all C must be A, therefore all C must be B*. Whatever be the relation of the terms, as to material connection, this does in no way affect the necessity of the inference.

(b) "There is no modal enunciation," says Valla; "there is necessity and possibility in the conclusion, as there is truth in all parts of the argumentation. For all must be true whether you say it is necessary, or possible, or easy, or honourable, or anything else. In this respect the true is the same as the certain, for nothing is true that is not certain and confessed. But the truth of the two prior parts of the syllogism and argumentation is placed as certain and confessed; in the last, however—that is, in the conclusion—it is extorted, and therefore there is in it necessity or *quasi* necessity."—(*Dialectica*, L. ii. c. 39, f. 50^a, ed. 1530.)

CHAPTER XXI.

COMPOSITE JUDGMENTS—HYPOTHETICAL OR CONDITIONAL,
DISJUNCTIVE, DILEMMATIC.

§ 320. Looking to the special relation of the subject to the predicate of a judgment, as direct (or unconditional), or indirect (or conditional), we have, as has been already said, the various forms of judgment, known as Categorical, and Composite or Conditional. For we may assert directly, absolutely, or simply one thing of another—that an attribute belongs to the subject—or that something will be or happen, or needs to be thought, if only something else in the first place happens or is thought. We may say *A is B*, or *if A is, then B is*. *If the sun is up, then it is day*. *A is either B or not-B*. *A is either B or C or D*. *The world is either eternal or not-eternal*. *The world is either the work of chance, or the work of intelligence*. *This intelligence is either a single act in a remote past, or it is a continuous act*. We have thus the Hypothetical Judgment (called also Conjunct and ('onjunctive) —*if is, there is*; or the Disjunctive Judgment—*this is either, or*. To these should be added the Hypothetico-Disjunctive, also called Dilemmatic, being a combination of the two first-mentioned, as *if A is B, it is either C or D*.

(a) With Aristotle categorical (κατηγορητικός) means affirmative. In later usage, it is applied to a judgment of simple or absolute assertion or denial, as opposed to the hypothetical or disjunctive judgment.—(Cf. Hamilton, *Logic*, L. xiii.) Aristotle cannot be said to have recognised the distinction of categorical and conditional (conjunctive and disjunctive) judgments, at least as grounds of reasoning, so as to form hypothetical and disjunctive syllogisms. This distinction or addition to the Aristotelian view seems to be due to Theophrastus and Eudemus. It was among the Latins elaborated by Boethius.—(*De Syllogismo Hypothetico*.)

(b) With regard to the use of *Hypothetical* and *Conditional*, it ought to be noted that the former is sometimes employed to mark the genus of Conditional and Disjunctive judgments, as by Aldrich and Whately. This usage ought not to be followed. Conditional is better suited to mark the genus of which hypothetical and disjunctive are species, though even this term is not unambiguous.—(Cf. Hamilton, *Logic*, L. xiii.)

§ 321. The Hypothetical or Conditional judgment is a statement of relation between an antecedent and a consequent, or reason and result. The form lies in the connection or consequence. *If A is, B is*; or *B is* on the supposition or condition that *A is*. *Should a stormy wind blow, that wall will fall*. In this form of judgment, the condition or hypothesis is attached to the antecedent or subject.

§ 322. The hypothetical judgment thus differs from the categorical, inasmuch as the latter affirms an attribute existing in a subject, or a subject as belonging to a certain class; whereas the affirmation, mental or real, of the consequent in a hypothetical judgment, depends on the previous or contemporaneous affirmation of the subject. It is one thing to say—*Lying is dishonourable*; it is quite another to say—*If this man lies, he dishonours himself*. In the former case we affirm an attribute of a subject; in the latter we do not properly affirm, but state a supposition or sequence following the realisation of a definite hypothesis. This is simply a preparation for absolute affirmation. It is not wholly determinate.

§ 323. In the hypothetical judgment there are three elements—the Antecedent, the Consequent, the Connection or Sequence—as, *If A is B, C is D*. *A being B* is the antecedent, *C is D* is the consequent. *If is, or if then,* is the copula, and indicates the sequence. The effect of the copula is to bind up antecedent and consequent into one act of judgment. It is, in fact, a statement simply of connection. As Ammonius Hermiæ puts it: "Hypothetic enouncements are made up of categoric. For they express the consequence or opposition of one categoric proposition and another, uniting them with each other, by either the conjunctive or disjunctive particles, in order to show that they constitute together a single enouncement."¹

¹ On *De Interpretatione*, l. 3, 1546. Quoted by Hamilton, *Logic* II, Appendix B, p. 389.

§ 324. The sequence, moreover, is a necessary one; for we are supposed to have in the antecedent a reason, full and adequate, otherwise there would be no reason at all for the consequent. This may be founded on material considerations of causality in the antecedent; but this is merely the ground, more or less valid, of the reason, or cause as a reason,—in a word, of the necessary form into which we suppose ourselves entitled to put the particular sequence. *If the one thing is, the other thing is.* This formula, however grounded in any particular sequence, is yet independent of the given sequence, and raises the connection to the form of a necessary one,—necessary in our thinking. Even if the reason or antecedent given were found to be insufficient to warrant the consequent, this would not affect the validity of the principle of connection, but only its material truth. At the same time, the principal value in practice of hypothetical judgment and reasoning is the material truth or actual sufficiency of connection between antecedent and consequent in any given case.

§ 325. The Hypothetical judgment may be regarded as in Extension, and as in Comprehension. In the former case, the formula will be,—*If A is, B is; if man is, animal is. If all A is B, then C (a part of A) is D (a part of B).* Or, *If all man is animal, European (a part of man) is mortal (a part of animal).* Here the supreme law or canon regulating the inference will be simply that of Identity. In this case Reason and Consequent will be completely identified with the formal law of the relation of whole and part.

In the latter case—in Comprehension—the formula will be—(a) *If A is, B is; if the sun is up, it is day.* (b) *If A have for its mark B, then C (a mark of B) is a mark of A. If the moon presents always the same face to the earth, then, having no diurnal revolution on her axis (a mark of always presenting the same face to the earth) is a mark of the moon.* The law which immediately governs this proposition, or rather the inference from it, is—*A mark of the mark is a mark of the thing itself, or Prædicatum prædicati est prædicatum subjecti. Nota notæ est nota rei ipsius.*

The subject in this case is taken comprehensively, as that which has immediate and mediate marks or attributes. The strength or validity of the assertion lies in the connection, however materially grounded, between the immediate and the

mediate attributes. This may depend on inherence or causality, on coexistence or succession, and affects the actual truth of the judgment; but the form or supposition being given, we are able logically, independently of this, to educe the formal consequence.

§ 326. In the Disjunctive judgment, the essence or form lies in the opposition or contrast of the several members of the predicate,—as *A is either B or not-B; A is either B or C or D*. The opposition among the disjunct members means that one is to be affirmed, and one only. There is just this much truth or assumption, that the subject is to be found in one or other of the members, and, if found in one, is not to be found in the other or others. In the former case, or strictest kind of disjunction, the logical form alone necessitates the exclusion; in the latter case, the whole of disjunction has been constituted through intuition; the members are given as exclusive on this ground; and hence the inclusion in one (or affirmation) implies the exclusion from the others. *The world is either eternal or non-eternal*, is an instance of the former—contradictory disjunction. *A was born either in 1801, or 1802, or 1803; the burglar made his escape either by leaping from the window, or from the roof, or by sliding down the rone*, are instances of the latter—contrary disjunction. Contrary alternatives are properly, in the end, forms of contradictory. *A is either B or C or D*, means really, *A or not-A, B or not-B, C or not-C*. *The world is either eternal, or it is the work of chance or of intelligence*. This, strictly taken, means *the world is either eternal or non-eternal (that is, it had a beginning in time); it is either the work of chance or not,—i.e., it is the work of intelligence*. *As the work of intelligence, it may be of a single act or not; that is, it is plural or continuous*. The disjunctive statement is thus also a preparation for determinate affirmation or negation, rather than affirmation itself.

§ 327. In the case of the disjunctive judgment, the copula is *either—or*; this brings together the alternatives in one act of conception. And this synthesis is the preliminary to the analysis or ultimate exclusion of the one from the other. All disjunction is affirmation and negation through affirmation, or it is affirmation through negation. For when we say *A is B, then it is neither C nor D. It is neither spring nor summer; therefore it is either autumn or winter*.

(a) It should be noted that disjunction has nothing whatever to do with Community or Reciprocity, as Kant would have it. Disjunction may refer to exclusive alternatives in time, or place, or quality, or quantity, which admit of not the slightest possibility of community or reciprocity, in any scientific sense of the terms, or in any logical or metaphysical sense. This time, that time, this place, that place, this quality, that quality, &c., have, as to real reference, or logical reference, not the semblance of reciprocity. All actual fact, indeed, is fact, whether there is reciprocity or not; for all fact of intuition—every percept—is exactly as it is perceived, as every concept is exactly as it is apprehended, whatever may be its possible or discoverable relations.

§ 328. There is a distinction between the hypothetical and disjunctive, which has not received sufficient attention. In the case of the hypothetical, as usually put, the consequent, while dependent on the antecedent, may not be dependent on it alone. When we say, *if it rains, the earth will be wet*, we connect reason and consequent, but we do not (materially) connect the consequent exclusively with the antecedent, for dew or pouring water on the ground may make it wet. Or when we say, *if this man is sick, he is not fit to travel*, the consequent may depend or be realised through other causes or reasons than the one specified. But in the case of disjunction, there is a wholly different conception. Our predicate in disjunction implies, from its very form, a whole,—the distribution, in fact, of a genus into its parts or species,—and these taken exhaustively or exclusively. *This is either A or not-A. This is either A, or B, or C, or D. The season is either spring or summer, or autumn or winter. This planet is one or other of the eight.* In all these cases we have determined a whole within which the subject of which we speak must be found or thought. There is no room for an indefinite number or plurality of disjunct members, as there is for a plurality of antecedents, as in the case of the hypothetical judgment. The disjunctive judgment, therefore, approaches much more closely strict logical form—of whole and part—than the hypothetical, at least as commonly understood and interpreted.

CHAPTER XXII.

HEGEL'S THEORY OF JUDGMENT.

§ 329. In the following paragraphs my aim is to notice the principal points in Hegel's doctrine of Judgment. I do this chiefly because I find that they have been adopted without any definite acknowledgment by writers who have referred to certain logical points, or have expressly treated of them. I notice them, also, because they are brought forward as specimens of "advanced thought." In themselves they are of the very slightest value—indeed, none. But as they are fitted to impose on people, simply from their novelty—a great charm in these times—the truth of a thing, if old, being rather against it—they require notice.

§ 330. According to the principle of the immanent dialectic, which has been laid down as absolute, and foreclosing a system of the universe, an idea posited opposes itself to its negation. This, in its turn, produces a new idea, necessarily better defined or more true than the first. In this second part, however, of the Science of Logic, called the Subjective Logic, it seems that development—that is, from notion to judgment and judgment to reasoning—does not take place according to the principle of negation, but quite another, viz., that of evolution or development, akin to the progress of organism in nature. The grain becomes the plant; it becomes in an explicit form what it was virtually before. Thus the notion passes into the judgment. The notion is the abstract form, the judgment the dialectical, and the reasoning the speculative form. Notions exist in things—things are only living notions, also things are judgments realised; and reasoning is the reality in its true or speculative form.¹

¹ Compare for this chapter *Die Subjective Logik*, being the second part of

§ 331. But supposing the notion to be the grain from which the judgment is evolved or which evolves the judgment, what of the origin of the notion itself? It will surely be admitted that the concepts of experience, and of science, are generalisations,—that they depend upon, are due to some process of elaboration or constitution by the mind. We need not at present refer to the universal concepts of intelligence, such as *cause, substance, quantity, quality, &c.*—which may be supposed to have another origin and character. The generalised concept is at least a cognition or relation among individual objects of time and space,—a cognition, in fact, of similarity amid objects or impressions at different times. Can this be cognised without a judgment?—without judgments of various orders? We judge surely when we apprehend a reality or impression in time. We judge or subsume under certain universal concepts of *being, unity, difference, &c.* We remember, compare, generalise. Not one of these acts is possible apart from judgment,—apart even from what is essential to logical judgment; and yet, according to Hegel, we have to wait for judgment until the notion develops itself into it,—the notion or so-called grain of the judgment being, in the first instance, the product of it. By judgment we form notions; notions, again, evolve into judgment; and thus judgment is explained! Such is the theory of advance in Psychology and Logic.

§ 332. The notion or idea of a thing is precisely the generality which exists in its individual. It is neither abstract nor distinct from things, nor posterior to them, but, on the contrary, pre-exists in them. Our religious understanding proves it in saying that God made the world out of nothing, or that the world is the work of thought, or of the ideas of God. This clearly proves that The Idea has by itself a creative power which has no need, in order to manifest itself, that things are already produced, but which, on the contrary, precedes their birth!

§ 333. The idea is at first general; but its proper dialectic force obliging it to determine itself, it becomes particular in denying itself; and this particularising, which is the negation,

Wissenschaft der Logik, ed. Berlin 1841. Of this there is an excellent abridgment in *La Logique Subjective de Hegel*, by Sloman and Wallon (Paris, 1854), which I have found of much use.

of the general, is manifested or comes to existence under the form of the individual. The particular and the individual are not, therefore, separate or distinct from the general; this takes these forms without changing its nature; it particularises and individualises itself, but always remains what it was at first.

§ 334. From the decrease in comprehension and the increase of extension in the ascending scale of generalisation, Hegel argues that God or the Supreme Being, as the last or highest notion, is necessarily to be regarded as the poorest of all in attributes, instead of, as He ought to be, the richest. In this it is assumed that God or the Supreme Being is identical with the abstraction Being, which is the *summm genus* in generalisation. Of this there is no proof; in fact, it is a perversion of accurate logical phraseology, and it is disproved by the fact, that while Being as a general notion can be predicated of all lower in the scale, God or the Supreme Being cannot properly be predicated of any.

§ 335. The general and the particular always subsist in the individual; hence there are no individual notions . . . Every individual thing is at the same time general and particular; and this union of the general and the particular in its bosom is precisely that which constitutes its proper notion or its individuality, which is thus only the product or image.¹

It follows from this that in the case of a generalised concept, as *book, house*,—*this book, this house*, is, as individual only, an image or instance, represented in the imagination of the general (concept) and the (individual) picture, and that this in no way differs from *the book* or *the house*, which I perceive or reach by intuition,—that is, it is untrue to our experience. All individuals, accordingly, in time or in history, are simply instances of general concepts embodied. Their whole individuality lies there. Proper names ought, therefore, to be discarded from language as a superfluity. Only the particular (*some* or *one* of all) is vindicable.

§ 336. In Hegel's view, the body and the soul of a judgment are its individuality and generality,—that is, the subject and predicate. The answer to a question gives necessarily a *subject*, which is only a simple word without meaning, on

¹ Cf. *Die Subjective Logik*, § i. c. 1.

which I arrest my attention to find the *predicate* of it. This is a thing without attributes or qualities, which is about to receive its determination, but which is yet absolutely nothing. It is only a name or sound.

§ 337. Modern logicians say or assume, that in the judgment the subject and predicate are two things or substances equally real, having the same value, existing on the same title and the same line, to be met with here or there in the world, and that the human intelligence unites or relates them in the judgment. But this hypothesis contradicts common sense and language, according to which the copula *is*, which joins the subject to the predicate, says that the first *is* the second; that which proves that the act of our mind called judgment, does not unite two things which without it would be separated, but, on the contrary, that it separates or divides into two parts, named *subject* and *predicate*, things or notions, which by themselves are at the same time that which marks the subject and the predicate. Judgment is, therefore, an act of the mind by which we divide into subject and predicate an idea or a thing which had not yet been divided, before this act, into its two constitutive parts. Thus the copula *is* marks not a conjunction but a disjunction, not only an identity but a difference between the subject and predicate, which by it are at once united and separated. There is a thing total or one, cut, so to speak, into two by judgment, which enables us to see it under the form of subject and predicate. In the eyes of the grammarian, the subject and predicate have an independent and distinct existence; but in logic, as in reality, there is absolutely none. The predicate *is* the subject, or rather the thing *is* actually the subject and the predicate together.¹

§ 338. (1.) There is no meaning in a subject taken by itself. If this means merely that a notion or concept cannot be realised in the mind without thinking its attribute or attributes, or the marks which make it up, it is an idle truism. If it means to call this process attaching a predicate to the subject by a definite assertion implied in the copula *is*,—that is, a definite judgment,—it is psychologically false. The marks contained in a concept as subject, can be realised in the imagination as a picture without any such explicit

¹ *Die Subjective Logik*, § i. c. 2., especially pp. 66, 67.

or express assertion. This representation is, moreover, the ground or condition of any such judgment.

If there be no meaning in a subject—that is, a notion or individual taken by itself, on what ground do I add a predicate to it? If it is on the ground of identity, or as an analysis of the subject, how can I predicate at all if the subject is purely a void notion? If it is that I add on a new predicate, how is it that I can attach in any way a predicate, new or old, to a void subject? When I say something of a thing, surely I know the thing to some extent ere I say something of it.

§ 339. (2.) Logicians, in saying or assuming that the subject and predicate in a judgment, or in some judgments, are actually separate, either in the world or in thought, until they are conjoined by the intelligence in an act of judgment, are quite right. For they are speaking not immediately of things, but of concepts simply, or of the individual and the concept. When I say that *water rusts iron*, or that *fire consumes paper*, I join together two concepts representative of things or facts in my sense-experience. And until I have done so, or have knowledge enough to do so, the facts lie out of my experience. Nor in this case do I need to say that the subject is the predicate, or that the subject is identical with the predicate; which would simply be false. *Water is not rusting iron*, *fire is not consuming paper*; but they form two elements in one synthesis, and the latter is an attribute of the former. I may represent *water rusting iron*, or *fire consuming paper*, as a whole or one thing—one complete fact—which by the act of judgment I divide or separate into two parts—subject and predicate—at once separating or conjoining and disjoining in the same mental act; but all the same, I have not identified the two concepts,—I have not even found the two things, *water* and *rusting iron*, together only at one time, for these are generalised concepts. I have, in order to make this one representation in the mind of *water rusting iron*, or *water wearing the rock*, been obliged to collect together facts from various points of time and space; and this gathered experience is the ground at once of my total representation of the thing and the judgment which follows. If the thing be “a judgment realised,” there is simply a judgment before my judgment, which I come to learn, and to gather, through

generalisation, extending over time, and varied particulars, not necessarily set together, and not yet gathered into one total representation.

§ 340. (3.) One would be curious, too, to learn how such a theory of judgment, even when applied to experience, would suit those cases in which we add a new predicate to the subject,—as when Newton said, *the planetary motions are due to gravity*. Was it that this hitherto unknown fact was reached by him by dividing in the first instance a totality in his mind—*gravitating-motion*, or by coming to unite, through experience and inference, gravity to motion, which, though joined in point of fact, had been hitherto separated in all human intelligences? Is not the representation as one or a whole of *gravitating-motion*, of *motion due to gravity*, or *light flowing from ethereal undulation*, the result of a synthetic judgment, rather than the ground of it? And is it not an abuse of words to call the complex fact in nature a judgment, unless as the supposed act or result of an intelligence conscious of realising the synthesis? And are we to talk of this with an assurance as complete as we can of our own act of judgment?

§ 341. (4.) Further, if the judgment be the breaking up of a known whole, containing what we then call subject and predicate, and we do not know which is which until the judgment shows it, how can we by judging show it, and how can the subject judging know the difference? Is this not simply to suppose that we have a judgment before we have a judgment?

§ 342. The essential character of every judgment, whatever its form, is to express that an *individual* thing posited as subject, is a *general* notion given as predicate,—in other words, that the generality marked by the *predicate* is (or exists) in the individual thing expressed by the *subject*. . . . The subject or individual thing is raised to the sphere of its predicate, and the predicate or the general, in its turn, is placed in existence or realised by the subject.¹ Hence, an enunciation which expresses an individual thing by its characters is not a judgment, as, *Aristotle died in the fourth year of the one hundred and fifteenth Olympiad, aged seventy-three*; or, *Cæsar was born in Rome; he made war on the Gauls for ten years, and passed the Rubicon*. Such statements are propositions, but not judgments.²

¹ *Die Subjective Logik*, pp. 69, 70.

² *Ibid.*, pp. 67, 68.

§ 343. There is a judgment, only when an individual thing is determined by a general notion. Therefore, one subject cannot be a concept,—it cannot be an abstract general concept,—we cannot state the relation between concept and concept; we cannot speak of an abstract term; we can only predicate in a judgment of the individual. Nor if the predicate be singular have we a judgment. I venture to say that such a criterion of proposition and judgment was never before proposed, and none more groundless or futile could be given. We cannot say, *this is not the man you mean, or took him for*. The predicate is singular, therefore there is no judgment. Is there any further *reductio ad absurdum* needed of reckless speculation or assertion?

§ 344. Hegel seems to find this doctrine rather too much even for him. He therefore hastens to add that individual enouncements are judgments, if they be stated in answer to a doubt. If the time of the death or the age of the philosopher were put in doubt, or if it were asked whether an individual was really dead, or only seemingly so, the answer to such a question would be a judgment, because generality is involved—*Has the train really passed the station or not? It has passed the station*. This is now a judgment; but if we had not been in doubt about it, and asked the question, it would not have been one! It comes to this, that no historical proposition is a judgment.

§ 345. To show that the predicate fills the subject, regarded as essentially void, with content, Hegel gives us the example—*God is all-powerful*. Without this predicate, *God* would be an empty frame. This, as the proof of a universal feature of judgment, is simply worthless. Even as filling the subject with content, it is not true; it is simply adding a predicate to what we know and may know of God otherwise. Because we happen to add a predicate to a subject, it does not follow that the subject was originally void. Had the predicate embodied an adequate definition of God, it might have been plausibly said to have filled the subject with content; but the predicate in this case is not such. *All-powerful* is not convertible with God; and were the statement even true of defining propositions, this would not make it true of all. Nay, the predicate here is even analytic, for we use it because we already know that, if this attribute were lacking, the sub-

ject spoken of would not merit the name *God*. And what, on such a doctrine, becomes of synthetic propositions, in which we are supposed to add a new predicate to that which we already know of the subject?

§ 346. The qualitative judgment represents the agreement or disagreement of two notions. This, according to Hegel, neglects what merits more attention—the coupling of the individual to a general notion.

Starting from the position that judgments are enunciations expressive of individual things by means of general notions, Hegel divides judgments into four kinds, viz. :—

- (1.) Qualitative, or of Simple Apperception.
- (2.) Reflective.
- (3.) Necessary.
- (4.) Ideal.

§ 347. The Qualitative Judgment or Judgment of Apperception affirms or denies a quality. But under this qualitative form, judgment is not yet developed : for the subject, which is nothing in itself, is here supposed essential ; the predicate, on the other hand, being nothing in itself, and only united to it in an accidental manner. By this form of judgment is obviously meant the comprehensive or attributive judgment of modern logicians.

§ 348. One of the greatest errors of logicians, according to Hegel, is to hold that such a proposition as *this violet is blue or not blue*, necessarily embraces in one or other of its alternatives the truth. This may be true or false without reaching the reality of things. That which is just is not always true. We reply to this that the proposition is both just and true, so far as it aims or need aim at truth. Whether *violet be blue or not*, is not here the question ; nor is such a point decided. All that is said is, these are exclusive alternatives ; they cannot coexist in the subject ; if one is there, the other is not. Our intuitional perception prevents us making the union. A subject—say *violet*, which would unite both, would be meaningless, void in the true sense of the word ;—as void and meaningless as to say *this is a case of murder or it is not* ; and yet it may be *both murder and suicide*, or *both murder and accident*.

Hegel's argument in support of his paradox is as weak as the absurdity of the paradox is strong. What is just is not always true, is proved, according to him, by such examples as

a man is sick ; some one has committed a robbery. These judgments may be just or accurate, but they are not true ; for a sick organism is not a true organism, and *theft* does not enter into the true notion of humanity !

§ 349. There is nothing peculiar to this first form of judgment, which does not belong to the third and fourth forms. It merely says,—the individual (I) is a generality (G),—that is, I—G. *The violet is blue*, or the individual violet is the generality colour blue.

That the individual is a generality is expressed in the same judgment under another form ; for this proposition,—*the violet is blue*, expresses, rather implies, two things at once,—that the violet is a whole endowed with several qualities, and that it has that of *blue*. But it does not expressly say the former, as it does not expressly say that the colour *blue* may belong to other individual objects besides the violet. This first form of judgment is imperfect, and therefore untrue.

§ 350. It is a wonderful test of the truth of a judgment, even of its imperfection, to find it stated that as the form of it does not express all that is possible about the matter, or all that is implied in the matter, though what it expresses may be both consistent and accurate, it is yet to be set down as imperfect and untrue. Pray, what single judgment would stand this test, except, perhaps, strict logical definition ? Are the exigencies of thought as a process of abstraction and concentration to have no fitting form of expression or judgment ?

§ 351. About equally instructive and convincing is the proof that every negative judgment is necessarily affirmative. *This violet is not red*, implies that it has a colour ! This obviously is not implied in the form of the proposition,—it is inferred from the matter ; because we are already supposed to know, regarding violet, that it belongs to the class of coloured things. But this is a wholly secondary form of judgment,—an accident, indeed, of the matter about which we judge. The negation of the predicate as the form of judgment does not put a positive in the place of the negation, even in the case of the qualitative or comprehensive proposition. For we may say, *The man of whom you speak did not inherit the property*. This, certainly, does not imply that he inherited anything else, or that there was anything else to inherit.

§ 352. The insufficiency, according to Hegel, betrayed in

those two sorts of judgments,—the qualitative affirmative and negative, is corrected by making the two terms of the proposition identical. Thus, *this blue violet is a blue violet*. But this is not a judgment, it is simply a tautology. So with all negative judgments called *impossible* or *infinite*,—as *this table is not an animal*; *the rose is not a plant*. In the case of tautology, the predicate is absolutely identical with the subject; in the other case, absolutely different. There is no putting an individual subject (I) in relation with a general predicate. All qualitative judgments issue either in tautology or in a futile infinity. And yet, as if to show the very licence of the possibility of differing, Hegel holds that negative infinite judgments exist. A crime is a negative infinite judgment, for the criminal not only denies the right of the individual, but the right of the State. Death, too, is a negative infinite judgment, for soul and body are separated so as to have no further relation.

§ 353. One fails rather to see the point of the imperfection of the form of the qualitative judgment; and certainly, if there be imperfection, we shall not find the correction in the formula given by Hegel, which is a simple travesty of fact and form. *This violet is blue*, means, it seems, *this blue violet is a blue violet*. It means necessarily nothing of the sort, and it can only be travestied into this on the basis of another previous judgment and meaning. *This violet is blue* means—(1) that I select or attend to the colour or *blueness* of the violet I see, and not to its shape or form, or other qualities, to which I might have attended; (2) that it has the mark *blue*, and not that of any other colour which it might have had. All this implies judgment, and judgment of an important and essential kind. It is the foundation, and affords the formula, of all observation, all concentration, and therefore of accurate thinking and science. Nothing of this is formulated in saying *this blue violet is a blue violet*, for this is a secondary or derivative statement, founded on the primary observation and judgment—that of fact regarding the object I see, and only possible after I have apprehended the predicate *blue* as its mark. I am not first speaking of what I know to be a *blue* violet, for *violet* and *blue violet* are not identical; and this statement, *this blue violet is a blue violet*, is only possible through an addition to my experience,—that is, the

other natural judgment by which I superadd a new predicate to the subject.

§ 354. As to negative infinite judgments, as Hegel calls them, it is clear that he does not know precisely what an infinite or rather indefinite term, *ὄνομα ἀόριστον*, is.¹ The so-called predicate in such a judgment is not in the least degree more in analogy with the predicate of a qualitative judgment than with that of any other.

§ 355. But as there is thus tautology in identifying the two terms, there is no correction of the imperfect form of the qualitative judgment. Also, when the two terms are absolutely unlike, there is as little correction of the imperfect form. Hence the dialectic force drives us to the following form—*Reflective Judgment*.

§ 356. The Reflective judgment explicitly translates the truth of the qualitative—viz., that the subject does not exist alone, but that there is a predicate, that is, a relation to a thing which exists out of it.

When we say *this violet or this flower is blue*, we may consider the subject or individual (I) as existing of itself; in this reflective judgment, on the other hand, as *this plant is salutary*, besides the thing in itself, we always think of some other thing, as the malady which the plant can cure.

In the Qualitative judgment, the individual was the principal thing, in which only the predicate appeared to inhere. In the Reflective, it is the predicate or general which becomes the important element. Thus—*Man is mortal; all matter is heavy; all things are perishable; certain forms of matter are elastic*.

§ 357. There is no such difference in those two kinds of judgments as is here supposed. The qualitative judgment about the individual passes readily into the reflective, really extensive judgment. The predicate in the former case may be at first individual, but as such it is the ground of a class—actual or ideal. And this class it grounds or forms is just as much a generality as that given in *salutary, useful, &c.*, or any other common term. The whole of this is a mere wandering from what is essential and relevant, and shows a constant confusion of matter and form.

§ 358. What can be more arbitrary or more misnamed as

¹ See above, p. 175.

necessary evolution or dialectic than this progress from the reflective judgment to the necessary?

Certain forms of body are elastic, means, it seems, that elasticity belongs to all bodies, but more particularly to some! Hence the subject loses its character of individuality, becomes general, and thus the subject and the predicate may be substituted for each other! But when the generality enters expressly into the subject, as *all bodies are elastic*, it is no longer a fact which we express, but a necessity. Hence the transition from reflective to necessary judgments. A doctrine which is based on the identification of *some* and *all*, which confounds universality with necessity, and is supposed to be bolstered up by a hypothetical dictum,—what can be said of all the individuals belongs necessarily to the species,—may be fairly left without comment.

§ 359. In necessary judgments, the subject and predicate are so related that the one is the true essence or substance of the other, and reciprocally. Further, they are subordinated as individual to the species of which it forms part. Thus, *the violet is a flower, this ring is of gold, gold is a metal*. The copula is here marks not simple existence, or relation, but absolute necessity. To say *that gold is dear*, and *gold is a metal*, is to state two totally different judgments. *Dear* is an accident, and *metal* marks the essence.

The form of proposition, *gold is a metal*, says implicitly that the quality of metal belongs not only to gold, but to silver, copper, iron, &c. Whence it follows that judgment does not carry in itself the proof or reason of its truth or necessity. This reason is expressed in the second form of necessary judgment,—the Hypothetical or Conditional—as, *if this thing is, this other thing must be also, or if A is, B is*. Judgments of this class almost deny the existence of the two terms A and B, by showing that neither A nor B can exist alone by themselves, because A is not only A but B.

Without losing the one, we recover the other in the Disjunctive form—that is, the third and last form of the necessary judgments. Thus *A (genus) is either B, or C, or D (species)*. These are the only species and all the species. But we need science to show us that the species actually enumerated complete the genus. We need, therefore, another form of judgment to show this.

§ 360. This leads to the highest of all,—the Ideal Judgments. These are conformed to the idea by which we judge that which is according to that which ought to be. Here the copula *is* has acquired all the energy which it ought to have.

The first form of the Ideal Judgment is purely Assertory, *as, this action is good, this house is beautiful*. But as doubt is not resolved, this judgment is really problematic.

The second form,—the Problematic Judgment,—is more advanced, since it is more explicit. It says, *In this or that point of view this house is beautiful*. But in this form there is still a doubt. Hence the need of another form—the Judgment Apodictic. This tends by itself to reject all uncertainty, repel all objection. *This (which shows the individual thing) house (which marks the general) built in such and such a way (which indicates that which it has of the particular) is bad or beautiful (which formulates the apodictic judgment)*. Hence this (*individual*) is finally a genus, rendered manifest in particularising itself. The dialectical force disengages itself from the apodictic judgment, and passes into reasoning.¹ These latter dogmata may very fairly be left without comment.

¹ *Die Subjective Logik*, p. 89 et seqq. Cf. the summary given in *La Logique Subjective*, p. 40 et seqq.

CHAPTER XXIII.

THE POSTULATE OF LOGIC—THE QUANTIFICATION OF THE
PREDICATE—NEW PROPOSITIONAL FORMS.

§ 361. Logic, as the science of the form of thought, necessarily demands that in the case of every given thought,—be it Concept, Judgment, or Reasoning,—the thought should be strictly analysed and determined, so that all that is in the thought, and nothing but what is in the thought as a mental fact, should be expressly set forth in language or symbols.

In this Logic asks nothing more than is required by every science which seeks its own perfection. Every science, in dealing with a matter or datum, seeks to know precisely and determinately what that datum is; and Logic as the science of the form of thought, requires to know exactly the thought, and its precise limitations, as in the mind.

Hamilton has expressed this in what he calls the Postulate of Logic. "The only postulate of Logic which requires an articulate enunciation is the demand that, before dealing with a judgment or reasoning expressed in language, the import of its terms should be fully understood. In other words, Logic postulates to be allowed to state explicitly in language what is implicitly contained in the thought."¹ This is essential to a scientific Logic. As a science of law and of the laws of thought, it must know precisely what it has got to regulate. The ambiguities and ellipses of language are thus, first, to be cleared up. Neither purely empty terms, nor ambiguous terms, nor so-called indefinite judgments, nor enthymematic reasonings can be accepted by Logic as they occur. Logic demands that these be rigorously cleared. And, in this

¹ *Logic*, ii. sect. 6, and ii., Appendix, p. 252 *et seq.*

precision, there is revealed the true state or process of the thought. Whatever amount of elliptical expression may be permissible in ordinary or in rhetorical speech, Logic allows none. It is not necessary as a speaker or writer that one should use the explicit form of thought which logical analysis demands, but it is necessary that the logician should make articulate the state of any concept, judgment, or reasoning, or that it should be given to him in an articulate form. Logic will thus teach us how we really think, when we seem to think otherwise than we do. Contradiction, vagueness, want of consecution, in our thinking, can thus, and thus only, be scientifically exposed. Such a postulate is a simple necessity for logical purposes. Thus only can we extricate the meaning clothed or hid in words. A proposition, as expressed in language, may have various meanings, according to intention and emphasis. It may be involved, defective, redundant, obscure, and until it is stated directly, categorically, in the case of a purely affirmative or negative judgment, it is unfit to be dealt with logically.

This postulate not only may, but must be made by logic; and it underlies the practice of every logical analyst. "It is the function of the logician, from the various formulas of speech (however involved), and from the scope of the oration or speaker, like a skilled anatomist to resolve or to dissect, member by member, what is said, that he may distinctly perceive (at least in his own mind) what is said of what, and how far, whether of the whole or of the part."¹ As has been said, whatever helps to exclude error, and to simplify logic, is a real addition to the science.

§ 362. It is from an application of this postulate that Hamilton reaches his doctrine of a Quantified Predicate; and on it as a general principle this doctrine rests for its vindication. It is clear that the postulate must be admitted, in other words, ordinary language must be translated into exact terms; ellipses must be supplied. We must state in language what is efficient in thought; and before proceeding to deal logically with any proposition or reasoning, we must be allowed to determine and express what it means.² The postulate is demanded by the ordinary logic not less than by that

¹ Wallis, *Logica*, ii. 11.

² *Logic*, ii., Appendix, p. 270.

of Hamilton. And if Hamilton's application of it in the analysis of judgment and reasoning show elements essential to those processes in our ordinary or actual thinking, it only carries out the Aristotelic analysis to a fuller and more scientific issue; and its pretensions to this must be tested by the accuracy of the analysis, and the necessity of the new forms in thought.

§ 363. The first application of the Postulate may be fairly taken in reference to the subject of Propositions. Here as everywhere we need explicitness in the data. Hamilton's classification of Propositions (Judgments) according to Quantity is new and important. The judgment is the proposition as thought; the proposition is the judgment as expressed in language. The judgment is (*a*) either of determinate (definite) quantity, according as we know and circumscribe the objects of which we speak; or (*b*) it is of indeterminate (indefinite) quantity, according as the sphere is not known and not circumscribed. Determinate or Definite Judgments relate either (*a*) to an undivided whole, and thus form a General and Universal Proposition, or (*b*) to a unity indivisible, and thus form an Individual or Singular Proposition. An Indeterminate (indefinite) judgment refers to some indefinite number less than the whole of a class, and thus forms a Particular Proposition. Thus, *every X is Y*; *every mineral acid is a poison*—is a Universal Proposition. Here we speak of the whole number of objects in the class. *Catiline is ambitious*—is an Individual Proposition. Here we speak of the whole, but it is a single object. *Some men are virtuous*—is a Particular Proposition. Here we speak of some indefinite number less than the whole.

The quantity of a judgment is thus always either indefinite or definite. In judging, we must judge either of some, or of the whole, taken universally or individually. These are the only quantities of which we ought to hear in Logic; and the expression,—the propositional form of the inner thought,—must, for purposes of exact logical analysis, adequately and thoroughly indicate the extent of the judgment. Hence what are called *Indefinite Propositions*—that is, propositions which do not indicate by their language the extent in which the subject is taken, whether indefinite or definite, cannot as such be dealt with logically. They should be called *Preindesignate*

Propositions—that is, propositions to which in language no mark or designation of their quantity, as in thought, is attached. When this is done, when a verbal sign, *some* or *all*, marks the extent in which they are actually thought, we have *Pre designate Propositions*.

§ 364. The new propositional forms arising from the Quantification of the Predicate are vindicated as legitimate,—as proper material of the science of logic, the moment they are shown to be possible forms of judgment or thought, and they can be shown to be more than that,—even necessary forms. Logic, as a science, must be “an unexclusive reflex of thought, and not merely an arbitrary selection out of the forms of thinking.” What may be the frequency or infrequency of the use of the form,—its importance or comparative insignificance,—has really little to do with the question of the legitimacy and necessity of it in the pure science of logic. All that is required to be shown is that the form in question is at work in our actual thinking,—it may be to us wholly unconsciously at work,—but if it be so, it is the function of Logic as a science to detect and unfold it, to bring it clearly out in the light of consciousness and explicit knowledge. And Logic is not complete as a science, until it has done this with every form of thought, be it judgment or reasoning, actually in operation* in the mental processes. And this can be shown by even the weakest of the propositional forms — parti-partial negation. In other words, Logic, as at least the science of inference, must know as a requisite to inference the precise meaning of the concept, or proposition, from which the inference is supposed to be possible. And if there be even the shadow of a lurking “meaning” in the proposition, that must be explicitly stated, otherwise Logic cannot begin even to exercise its function. And this completely vindicates Hamilton’s Quantified Predicate; for the express quantification is, as he says, to be produced “on demand,” and that is all which his doctrine requires.

(a) Mill actually regards the logical postulate as a particular case of the Principle of Identity “in, as he says, its most generalised shape. It is a case of postulating to be allowed to express a given meaning in another form of words.”—(*Examination*, p. 483.) It is a case of nothing of the kind. There is no “given meaning” to commence with. It is a case of asking that the person speaking should expressly say what he means to say, and all that he means to say. His meaning is only given when

it is fully expressed. If, for example, he is speaking of *all* of a thing, he should say so; or of *some*, that he should say so. Or, if he is reasoning with a suppressed premiss or reason in his mind, that he should state it in order that it may be scientifically—that is, logically, dealt with.

§ 365. "In fact, says Hamilton, ordinary language quantifies the predicate, so often as this determination becomes of the smallest import."¹ This is done, for example, when we speak of any definite number, as *all* of a class. *The three boys here are all that were in the field. Eight stars are all the planets. These were certainly some of the rioters.*

§ 366. We further expressly quantify the predicate every time we frame a definition, for in a definition proper, subject and predicate are not only convertible, but alone convertible—as *man is rational animal*. The test of this is that *all rational animal is man*. *A good government is that which has the happiness of the governed for its object; hence every government which has the happiness of the governed for its object is a good one. Common salt is chloride of sodium; and conversely.* Unless the universal quantification of the predicate be here admitted, and that in an affirmative proposition, it will follow that a definition cannot be stated in a single proposition. In fact, every simply convertible universal affirmative, implies that the predicate is taken in its fullest quantity, as *all*,—either *every one* or *the whole*. This occurs every time we identify one class with another—one total or whole with another.

(a) The quantification of the predicate is further justified by grammatical usage—that is, by the form which expresses the ordinary requirements of speech. In Greek the definite article, as we have seen, has a power of specification, in other words, of rendering definite,—either in the form of universality or singularity.—(See above, p. 258.) And the rule as laid down by Ueberweg is as follows: "Whenever the predicate in Greek has the article, the spheres of the subject and predicate notions coincide; when the spheres of the subject and predicate notions do not coincide, the predicate in Greek has never the article."—(*Logic*, p. 315.) When we say *εἰρήνη ἐστὶ τὰ κατὰ, peace is the good, or highest good*, we quantify the predicate by the article, both in Greek and English.

Quantification of the predicate by the superlative degree is of course of the commonest occurrence, as *κλεῖνσις γὰρ αὕτη μάλιστα ὅη τοῖς Ἑλλήσιν ἐγένετο*; just as we might say in English—*Sirius is the brightest star in the heavens.*

¹ *Logic*, iv., Appendix v. (c).

The formation of what are called Substantival Phrases by means of the article with the infinitive is really the specification of an attribute, as τὸ ἀμαρτάνειν, *sinning*, τὸ εἶναι, τὸ φιλεῖν. The article prefixed to the neuter singular of the adjective also specifies attribute, or abstract name, as τὸ καλόν, the beautiful; τὰ καλά, beautiful things—that is, in extension. So in German *das Gute*, the good; *die Guten*, the good people.

The definite article in Greek is used as a pronoun, as in Homer,—*Νέστωρ δ' γέρον*,—*Nestor, that aged man*. In this case there is equivalence of subject and predicate, as in a singular judgment.

The child plays alone (*solus*) is μόνος ὁ παῖς παίζει (predicative); ὁ μόνος παῖς παίζει, the only child plays (*unicus*).—(See Clyde's *Greek Syntax*, pp. 18, 19.)

In the connection of πᾶς with numerals, we have an example of the quantified predicate of absolute totality, as τὰ πάντα δέκα, *ten in all*. Take away the article, and say πάντα δέκα, and then it means *ten of each*—that is, there is the difference between totality and distribution.

§ 367. There are certain propositions regarded as compound, which proceed on a total quantification of the predicate, even in affirmatives, and which are most readily and properly resolved into the logical formula of *A is all B*, or *all A is all B*. These are chiefly Exclusive and Exceptive Propositions.

Exclusive and Exceptive Propositions are known in the *Parva Logicalia*, and in subsequent logical treatises as *Propositiones Exponibiles*. They formed the stock-in-trade of the Terminalists from Hispanus downwards. Scheibler, among others of the moderns, has given an exposition of them. One general rule is that every exclusive proposition is resolvable into an affirmative and a negative,—*man alone is rational* is equivalent to *man is rational*, and *what is not man is not rational*; the first is the *propositio exponibilis*, the other two the *propositiones exponentes*.¹

In Exclusive Propositions, or rather “inclusive limited by an exclusion,”² there is a tacit quantification of the predicate, thus, *God alone is worthy of being loved for His own sake* is called an exclusive. It is held to contain two judgments,—(a) that God is to be loved for His own sake, and (b) that other things are not to be loved for their own sake, or ought to be loved for God's sake. According to the principle of the quantified predicate, this would make one proposition—viz., *God is all that is worthy of being loved for its own sake*.

¹ See Scheibler, *Op. Log.* iii. 7. Hamilton, *Logic*, iv., Appendix v. (c).

² Hamilton, *Logic*, iv., Appendix v. (c).

And this is convertible. Others may be similarly resolved, as—*Quas dederis soles semper habebis opes. Nobilitas sola est atque unica veritas. Hoc unum scio quod nihil scio. Una salus victis—nullam sperare salutem. Unus Dominus, una fides, unum baptismum.*

These and other apposite examples of Exclusives¹ may be readily reduced to one proposition, on the principle of the Quantified Predicate. At the same time, every such proposition may be contradicted or negated in three ways,—for (a) we may deny, for example, that virtue is nobility, or agrees with the subject at all; (b) we may maintain that birth confers nobility as well—that is, agrees with something else; and (c) that birth confers nobility and not virtue—that is, we may maintain both.²

It is certain that there is nothing certain—or, uncertainty is all (the only) certainty. This may be denied (a) by saying, with the dogmatists, there are things of which we are certain, and there is certainty; or (b) with the Pyrrhonists, everything is so uncertain, that it is doubtful whether there is nothing certain.³

§ 368. It is clear, I think, in such cases, that the proper opposite of such propositions is that which denies the exclusion. We deny, for example, that *virtue is the only nobility, or is all nobility.* Other propositions may follow from this as immediate inferences, as, for example, that other things make nobility, or that there are some things which are noble, though not virtues. To maintain that virtue is not nobility at all, is to go beyond the limit of the negation which we need to assert as the opposite of the proposition.

§ 369. In Exceptive Propositions, we affirm something of the whole subject, with the exception of certain subordinate objects or clauses under it. This is indicated by an exceptive particle. Thus, *none of the philosophers, except the Platonists, recognised the spirituality of God. Except the wise man (of the Stoics) all men are truly fools. Avarus nisi cum moritur, nihil recte facit. Nemo læditur nisi a seipso.*⁴

These are obviously resolvable into, *those who recognised the spirituality of God were all Platonists; or better, Platonists were all who recognised the spirituality of God. The wise man of the Stoics is all the class wise, or the wise man of the Stoics is*

¹ See *Port Royal Logic*, Part II. c. 10.

² *Ibid.*

³ *Ibid.*

⁴ *Ibid.*

the wise man. The proper opposites here are, *other besides Platonists recognised the spirituality of God,—or Platonists were not all who recognised the spirituality of God.* So *other men were wise besides the wise man of the Stoics, or he does not exhaust the class wise.* This is all we need to assert for purposes of denial. We need simply to deny the convertibility of the proposition. We do not require to say, *the wise man of the Stoics was a fool, or he was a fool and other men were not,*—as has been suggested;¹ though no doubt such propositions would have the effect of denial. It may thus be admitted that Exclusive and Exceptive Propositions may be regarded as compound, but it is obvious that they do involve the quantification of the predicate, and the simple and scientific way of treating them is to resolve them into this logical form. Thus only can we set against them their proper and relevant contradictory, or bring them to the test of the mutual convertibility of subject and predicate.

When it is said that *pain is the greatest of all evils*, we need only to deny its maximum degree, not the fact of its being an evil, or to assert that it is no evil, as has been suggested.²

§ 370. But in truth the express quantification of the predicate follows as a necessity from the very nature of predication in extension. The predicate in extension indicates a class. Affirmative predication is the reference of the subject to the class. It must have *some* place in the class—*some at least.* This is the first-requisite of the act. *Plant is organised*—that is, *some at least.* This I must know before I say it,—before I express predication at all. Why, then, not designate the extent in which I mean the predicate term to be taken? Again, I may know and mean that the place of the subject in the class is that it occupies the whole of it. I say, *all triangular is triangular*,—meaning *all triangular.* Why not, even, to avoid ambiguity, express this? I may, of course, only need, for the purposes of my argument, to say that it is *some at least.* Then let me say so. But if I mean *all*, I am equally bound to express it in logical argument. So with *not any*, and with *not some*, as a mark of particularity in negatives. If what I have in my mind is *not any* of the class in a negative, I am bound to express it designately. If only *not some*, I am under a similar obligation, for these are very different state-

¹ See *Port Royal Logic*, Part II. c. 10.

² *Ibid.*

ments. I am not bound, of course, to express in language more of the predicate than I mean, or use, or need, in the argument. I am thus not bound always to say, though I know it to be the case, that *all* of the subject is *all* of the predicate, if *some* of it will suit the needs of my argument. But I am bound in logical strictness to state whether I use *all* or *some*. This is really all which the quantification of the predicate implies. And as such, it is a simple necessity of logical exactness, and therefore of logical science.

§ 371. While the predicate of any one of the four ordinary logical forms remains without express quantification, the proposition is left ambiguous. If I say, for example, *All A is B*,—I may mean *some of the Bs*,—or *all of the Bs*. I may mean *all A is some B*, or *all A is all B*. If I say *no A is B*, I may mean *no A is any B*, or *no A is some B*. *No plant is any animal*; *no planet is some star*.

The ordinary Logic assumes that men usually, or rather universally intend to assert in a universal affirmative (*A*) that *all A is (some) B*, and in a universal negative (*E*) that *all A is not any B*, or in a particular (*O*) that *some A is not any B*. But even adding to these the particular affirmative (*I*), do these exhaust the possible or scientifically valid forms of statement or proposition? Do they exhaust even the necessary and useful forms? Hamilton answers no; and he claims the right (1) to give express, not merely understood, quantification to the predicate alike in affirmative and negative propositions recognised on the ordinary system, and (2) in virtue of the same principle to give an express quantification to the predicate in other propositional forms. He further challenges the validity of the two received logical canons (*a*) that in all affirmatives the predicate is particular, and (*b*) in all negatives this predicate is universal. Hamilton's procedure is in no way a departure from logical method or principle. It is simply a demand that what is understood in thought, as the nature of certain propositions, should not remain implicit or understood, but should be expressly set forth, and that this demand, realised in some propositions, should be applied to all.

§ 372. The vindication of the quantifying of the predicate depends mainly on this, as to whether it subserves the end of testing inference, the main aim of Logic. That it does so, as regards immediate and mediate inference alike, is indisputable.

When I apply the predicate to a subject, do I mean to say that it applies to the subject only, or to the subject at least? *Plant is organised*—do I mean by *organised* some at least—or do I mean that *organised* applies to nothing more than plant? These are two very different statements indeed; and they afford very different kinds of inference. *Organised* as a predicate, and therefore as a middle term in a reasoning, is wholly ambiguous, until the specific limit of it is precisely cleared in expression. Logic to be scientific, to exhibit properly inferences, must demand the explicit quantification as a preliminary. Common thought and speech may be satisfied with the minimum of quantification—the *some at least*. Logic must know whether or not the maximum is intended and meant.

(a) "The syllogistic theory is not an analysis of the reasoning process, but only furnishes a test of the validity of reasonings, by supplying forms of expression into which all reasoning may be translated if valid, and which, if they are invalid, will detect the hidden flaw."—(*Examination*, p. 513.) That is, we can have a test of valid and invalid reasoning, which is not founded on an analysis of the reasoning process. A form of expression which does not express any analysis whatever of the reasoning process, might be—nay, is alleged to be, the test of the validity and invalidity of all reasoning. Words are higher than thought—the test of its validity—words that do not in any way necessarily express the inner process of thinking! On this supposition, Mill for a moment admits that "a form which always exhibited the quantity of the predicate might be an improvement on the common form."—(*Ibid.*) He is even "not disposed to deny that for occasional use, and for purposes of illustration, it is so."

(b) "There is not a single instance, nor is it possible in the nature of things that there should be an instance, in which a conclusion that is provable from quantified premisses, could not be proved from the same premisses unquantified, if we set forth all those which are really involved. If there could be such an instance, the quantified syllogism would be a real addition to the theory of logic; if not, not."—(*Ibid.*, p. 518.) In other words, there is not a single instance in which a conclusion that is provable from quantified premisses could not be proved from the same premisses unquantified, *if we quantify these*. What is the setting forth all those which are "really involved," but the express statement of the degree of distribution or quantification of the terms? And this is the summary of Mill's criticism of a new logical theory, which, whether competent logicians accept all its details or not, has certainly modified all logical doctrine since its promulgation.

(c) The climax of objections to the quantified predicate is reached in the grand, undefined, verbalism—"a psychological irrelevance." Yet Mill tells us this process, in general forms of proposition, is familiar to the ordinary logic which represents accurately processes of thought. That which is essentially sound in several cases, and,

therefore, in its principle, becomes "a psychological irrelevance,"—when extended to other cases.

§ 373. Hamilton says every predicate is quantified in thought—at least in extension. But what is meant by quantified? In the first place, when we say that the predicate applies to the subject, be it attribute or class, we must mean and say that it is coextensive with the subject *at least*. The predicate is thus necessarily quantified in thought, whether taken comprehensively or extensively. In comprehension the attribute does not vary; in extension the class does vary. In extension the predicate may not be quantified at more than the necessary minimum; but it is quantified. In the second place, if the predicate apply to more than the subject, as it may, and if we know this, as we may, the predicate is quantified in thought by *some only*. The river runs,—it is one only of the running things. Other things run also. In the third place, if the predicate apply to the subject only,—as equiangular to equilateral,—and we know this, then it is quantified in thought. It is a very odd ground of objection to the doctrine that the predicate is always quantified in thought—that there is always a minimum amount of quantification in thought—that there may be a higher known to us—that is, in thought. Why not, therefore, to remove ambiguity, on demand, state expressly in language what we think and mean? How else can we logically deal with the thought? Hamilton's statement is thus thoroughly vindicated, that in every case there is a quantity in thought, and this ought to be set forth in expression. The habit of looking explicitly at the quantity of the predicate—considering in all cases exactly what we mean, is of the greatest utility in simplifying our logical statement, in restricting it, guarding it against ambiguity and the possibility of invalid conclusions.

(a) Mill has no correct conception of what quantification of the predicate means. He has no conception that when the subject is regarded as coextensive with the part at least of a class,—this is quantifying the predicate—*i.e.*, particularly. His confusion is that he imagines that to quantify the predicate means always thinking of it as embracing other things (or subjects) besides the present subject—or subject spoken of. This, no doubt, is quantifying the predicate, but it is only one case of it. *The river runs* is one only of the running things,—this is quantification; but there is no less quantification when

I say *the river runs at least*, or simply *the river runs*, because I have made the quantity of the predicate coextensive at least with the subject—*river*; it is one at least of the running things. This comes out quite clearly in the statement that the predicate has usually no quantity in thought, because it is simply thought as coextensive with the subject; and in the statement that in a universal proposition we think of the subject “as its several parts.”—(*Ex.*, p. 512 and note.)

(b) Mill imagines that he disproves the existence of a quantitative judgment in thought, because we can judge qualitatively—or in comprehension—without reference to quantity. He appeals triumphantly to “every reader’s consciousness” that we can judge that *all oxen ruminate*, without knowing or considering whether anything else does. He might have learned from Hamilton himself that in the comprehensive judgment the predicate as attribute appears without quantification. But this in no wise settles the question as to whether, judging in quantity with the predicate as a class, we can judge without a specific meaning as to quantity. In this case we must mean that oxen are *some at least* of the ruminant, or *all* of the ruminant, or *some only* of the ruminant. It is true, as Hamilton lays down, that “in reality and in thought every quantity is necessarily either all, or some, or none.”

It is as ridiculous to say that no predicate is universally quantified in thought as to say that every predicate is. If we understand our meaning,—if we have a definite meaning, which we ought to have,—we either think of the predicate as some, or all.

§ 374. It is not true that “the logic of the quantified predicate takes the comprehension out of propositions, and leaves them a *caput mortuum*.”¹ A proposition in Extension derives its meaning from the corresponding proposition in Comprehension, on the general principle of the correlation of the two quantities. This is Hamilton’s doctrine from beginning to end of the whole matter.

(a) Mill admits everything for which Hamilton contends as to the fact of our judging and reasoning in Comprehension as well as in Extension. He admits that the former is prior and more natural; that the latter flows from the former—is, in a sense, identical with it, true if it is true; that the ordinary logics proceed exclusively on Extension in judgments and reasonings; that this is hurtful in practice. I appeal to the pages of his *Examination*, in chapter xxii., p. 497 *et seqq.*, for the truth of these statements. Yet he makes these admissions as a preliminary to an attack on Hamilton for holding them—for introducing Comprehension into Logic! On this and other points in Mill’s criticism, see the admirable exposure given in *Hamilton versus Mill* [by Mr Simon]. It is greatly to be regretted, in the interest alike of fair criticism and the science of Logic, that the author has not yet given Part III. to the public.

(b) But the critic waxes still bolder. We do not, according to Mill,

¹ *Examination*, p. 517.

usually quantify even the subject in thought, in the sense which Sir W. Hamilton's theory requires. "In an universal proposition we do not think the subject as an aggregate whole, but as its several parts. We do not judge that *all A is B*, but that *all As are Bs*. *All A* is a very different notion from *each A*. What is true of A only as a whole forms no element of a judgment concerning its parts." . . . "If *all A is all B* is true at all, it is true *only* of A considered as a whole, and expresses a relation between the two classes as totals, not between either of them and its parts."—(*Examination*, pp. 512, 513.)

Hamilton's theory requires only what in fact and reason must be admitted the two meanings of *all*, as *every* and *the whole*. In a proposition with a universal subject, do we not speak of *all* the parts—that is, of every one gathered into a whole? *All plants are organised*, means that organised applies to the whole sum of objects classed as plants; or that we shall find the totality called *plant* under the class *organised*. This supposes, of course, that *organised* is predicable of *every* plant, and that we have summed up the *every* into a whole or *all*. But do we now continue to think or to speak merely of "the several parts"? Nay, do we not think and speak of *plant*, the class, rather than of this or that plant? It is not merely of "the several parts" we speak, but of *every* one, and, if of every one, then of the whole class. We never can, according to this view, predicate of a sum or class of objects regarded as a whole; we must always predicate of each part forsooth! If we speak but of the parts severally or separately, how is it possible thus to say that the *whole class* is included under *organised*? *Each* plant is in its turn a part of *organised*, no doubt; but this is a very different judgment from *the whole* are, or *the whole class plant* is so included. Again, Mill reads *all A is all B* as *all A only is all B*, or, *A regarded as a whole is all B*. *A taken as a class only*. This is not the necessary meaning of *all A*. It is only the meaning in the case of a Collective notion proper, made up of units different from the sum—as an *army*, a *regiment*, a *ministry*, a *presbytery*, &c. Here what is true of the whole is not necessarily true of each unit; but this is a special kind of whole—not the ordinary logical whole—in which the class-name is always predicable of each of the parts. *Army*, *regiment*, is not predicable of *soldier*—he is not the regiment; nor *presbytery* of *presbyter*—he is not the presbytery. But in the case of the ordinary logical whole, the class-name is predicable of each member of the class. *Animal* is predicable of *man*, *bird*, and *beast*. And if we speak of all the class, or all A, in this sense, we can say that *it is all B*. We can say, for example, that *all equilateral is all equiangular*, or that the whole class equilateral is identical with the whole class equiangular. And this expresses not only a relation, as Mill alleges, between the two classes as totals, but between them as parts—(*ibid.*, p. 513)—for it implies that every A (equilateral) is to be found in every B (equiangular). Otherwise we should have the absurdity, the contradiction, that the whole objects included in the class A are convertible with the whole objects included in the class B, and yet there is an A which is not a B!

(c) Again, it is said, *all A is B* is not spontaneously quantified in thought as *all A is some B*. When the speaker or learner is told this, it is a new idea to him.—(*Ibid.*, p. 512.) Suppose it were, what then? Has he not now been told what his statement must at least mean? Is it not necessary to the coherency, to say nothing of the truth, of the statement, that *A is some at least of the Bs*? And whether the individual thinker had this or more in his mind, does not the thought he expresses demand him to mean this, or something more than this? And if he be confused or ambiguous, does not this very confusion justify the logical postulate that the thought must be explicitly stated in language? And of what highest use or precision is such a judgment, if the speaker does not know whether he means *some*, or *all*?

As it has been well put, when I say *all A is B*, or *all asses bray*, it is not maintained by Hamilton that we must know whether *braying* actually extends beyond *asses*, or not; but he maintains that we must know it extends to all asses. And it is not true that, in order to form a proposition in Extension, we must know this greater extension. All we need to form such a proposition is that the braying extends to the asses *at least*. This is to quantify the predicate (particularly).—(*Hamilton versus Mill*, Pt. ii. p. 216.)

§ 375. Hamilton has indeed already answered these and other objections made to the quantification of the predicate.

(1.) In the case of Universal Affirmatives, the universal quantification of the predicate is “always untrue,”—*all man is animal*, but *all animal is man*,—the supposed converse is not true. This is of course materially untrue; but what then? It so happens to be so in this particular case; but is it untrue, much less formally illegal in all? What, then, of the propositions,—*all rational is all risible*, *all trilateral is all triangular*, *all triangle is all figure with its angles equal to three right angles*? Aristotle, who makes this objection in practice, proceeds, as he must proceed, on the quantification of the predicate, as in Induction and Demonstration.

(2.) In the case of Reciprocating Propositions—as *all man is all risible*—it is alleged that if the predicate were quantified, the *all* as applied to the subject being distributively taken, this would imply that every individual man, Socrates, Plato, is *all* (that is, the whole class) *risible*. There is nothing in this. *All* may be used either distributively or collectively, but if it be used in the one sense in the subject, it ought to be used in the same sense in the predicate. “In the same logical unity (proposition or syllogism), the same term or quantification should not be changed in import.” Thus we should have, collectively, *all (the whole class) man is*

all (the whole class) risible; distributively, all (every several) man is all (every several) risible.

(3.) With regard to the objection that the quantification of the predicate is useless, Hamilton points to its consequences as shown in the changes thereby introduced into the science of Logic. There is in the main the restoration of the science of logic to simplicity and truth; and especially (1) the simplified and scientific treatment of Exponibles — Exclusive and Exceptive Propositions; (2) simplification of Conversion; (3) of Mood and Figure, and their rules; (4) restoration of forms of Reasoning illegitimately and inconsistently excluded; (5) theory of Proposition and Reasoning as Equation.¹ All these points will be illustrated in the sequel.

§ 376. The term quantity has been indiscriminately applied to a concept viewed in Extension and in Comprehension. In this, as it seems to me, there is both confusion and inaccuracy. A concept viewed extensively has obviously a quantity—it is a whole which contains objects, and it may be greater or less; it may be taken in the whole of its extent, or only in part of its extent. *Animal* is a whole; it contains species and individuals under it, and we may speak of the whole of the class—*all*, or of a part of the class—*some*.

The conception of quantity is not, however, as appears to me, so strictly, if at all, applicable to the concept in Comprehension. No doubt, if a notion contain in it a plurality of attributes, it may be said to possess quantity; for it contains a variety of constituent elements. At the same time, it is obvious that a notion as a sum of attributes cannot be subject to degrees of greater or less; for if we take from any notion even one of the attributes which it contains, it ceases to be the notion which it was before. If, for example, we take from *animal* the attribute *sensation*, leaving only *being with life, &c.*, what remains is not the notion of *animal*. So that a notion, viewed as a sum of attributes, is absolutely indivisible, and cannot in strict propriety be said to possess quantity. This is even more apparent respecting a notion which has only one attribute—as *mortal* (*subject to death*), *extension*, *succession*, *unity*. An attribute is absolutely indivisible, and as such has properly no logical quantity. When we think or speak of the attribute *mortal* or *sentient*, it is of the attribute

¹ *Logic*, ii., Appendix, p. 295 *et seq.*

as absolutely entire or indivisible. When we use the term *mortal* as the name of a class, we think and speak of *all* or *some* of the beings of the class; but when we use *mortal* as the name of an attribute, we must think and speak of the attribute in its indivisible integrity. *Sentient* or *mortal* as the name of a class is repeated in each of its portions or sub-classes; *mortal* as an attribute, if divided, is destroyed.

§ 377. It does not affect this doctrine that the indivisible mark or attribute may be also in other objects besides the subject or predicate of the given proposition. It may quite well inhere in other subjects or objects. *Wood is combustible*, so is *coal*. *Iron is a mineral*, *gold is a mineral*. All the same, the attribute as attribute is entire in each—it is capable of distribution over many subjects; but it is complete, indivisible in each; and is thus wholly different from the predicate as a class-notion.

§ 378. This distinction does not appear sufficiently marked in the doctrine of Propositions in the ordinary logic, or in that of Hamilton. In the *Lectures on Logic*, the term quantity is applied indiscriminately to concepts in Extension and in Comprehension. In the later forms of his theory, Hamilton recognises the distinction in words; but he makes no thorough-going application of it to the theory of Propositions. He says: "A judgment or proposition is only a comparison resulting in a congruence, an equation, or non-equation, of two notions in the quantity of extension; and that these compared notions may stand to each other, as the one subject and the other predicate, as both the subject, or as both the predicate of the judgment."¹ "I say in respect to their Extension—for it is this quantity alone which admits of ampliation or restriction—the comprehension of a notion remaining always the same, being always taken at its full amount."²

§ 379. But the view has a very important bearing on Propositions, especially on the doctrine of a Quantified Predicate. Whether the attribute stand as subject or as predicate, it is to be taken as a unit—as indivisible. We speak of the whole of it or not at all. As a predicate, therefore, it does not admit of greater or less, unless intensively, which does not affect its character or mark; it has no extensive quantity, or it is

¹ *Logic*, App., iv., 276.

² *Ibid.*, p. 271.

always quantified to the full, if we may apply quantity at all. In an affirmative judgment, therefore, the attribute is predicated as a unit or whole. *Man is mortal, animal is sentient*—that is, everything in the mark *mortality* is in *man*, and everything in *sentientcy* is in *animal*. In a negative judgment, the attribute or mark is denied of the subject, wholly or completely. *Sugar is not chloride of sodium; ether is not ponderable; matter is not a thinking substance; some sins are not crimes*. Here the attribute as predicate is wholly or absolutely denied of the subject; and we could not do less without destroying the judgment itself.

It may be maintained, as with the Port Royalists, that “the negative proposition does not separate from the subject all the parts contained in the comprehension of the attribute, but separates only the total and complete idea composed of all these attributes.” This can only even seem to apply to a case where the predicate is complex, or the sum of a plurality of attributes,—as in *thinking substance*. *Matter is not a thinking substance*, but it is not said that it is not a *substance*. The total or complete concept alone is denied. *Animal is not a rational and responsible being*—it may still be a *being* of another sort. This does not affect the main position; the comprehensive concept as a predicate is a unity, and as such it is absolutely or wholly denied of the subject. Whether another notion, containing a part of the one element of the complex concept may be affirmed or not, in no way appears from the proposition itself, or what are the other marks of the subject. *A does not contain in him magnanimity*. Other virtues he may have, and *virtue* is an element in *magnanimity*; but the exclusion is complete, for we deny *the virtue* represented by or in *magnanimity*, *the substance* represented by or in *thinking*, *the being* represented by or in *rational and responsible*.

(a) The author of the *Logic of Port Royal*—the acute Antony Arnauld—has the merit of at least partially recognising this principle of the indivisibility of the attribute predicate.

“An idea is always affirmed according to its Comprehension, because in taking away one of its essential attributes we utterly destroy and annihilate it, so that it is no longer the same idea; and, consequently, when it is affirmed, it is always affirmed in relation to everything which it comprehends within itself. Thus, when I say that *a rectangle is a parallelogram*, I affirm of *rectangle* everything contained in the idea of *parallelogram*. For if there were any part of this idea that did not belong

to a rectangle, it would follow that the whole idea did not belong to it, but only a part of that idea; and thus the word parallelogram, which signifies the whole idea, ought to be denied and not affirmed of the rectangle."—(Part II. c. 17.)

With regard to affirmatives; the rules are:—

(a) The attribute of an affirmative proposition is affirmed according to its whole comprehension; and (b) affirmed not according to its whole extension, if it is in itself greater than that of the subject; (c) the extension of the attribute is restricted by that of the subject, so that it denotes no more than that part of its extension which agrees with its subject. In *men are animals*, *animals* means not all, but simply those animals which are men.—(L., Part. II. c. xvii.)

With regard to negatives, it is held (a) that the proposition does not separate all the parts of the comprehension of the attribute from the subject, but only its totality; whereas (b) the proposition separates from the subject the idea of the attribute according to the whole of its extension.—(Part II. c. 19.) The distinction of comprehension and extension in the rules is not clearly marked; nor is the conception of the true nature of the comprehensive predicate steadily applied to negatives.

§ 380. The theoretically valid forms of proposition, on the principle of the quantified predicate, are, when fully stated, as follow:—

- (1.) *All X is all Y*— AfA .
- (A) (ii.) *All X is some Y*— AfI .
- (3.) *Some X is all Y*— IfA .
- (I) (iv.) *Some X is some Y*— IfI .
- (E) (v.) *Any X is not any Y*— AnA .
- (6.) *Any X is not some Y*— AnI .
- (O) (vii.) *Some X is not any Y*— InA .
- (8.) *Some X is not some Y*— InI .

§ 381. Thomson's classification is as follows:—

1. A. *All plants grow*—Universal Affirmative Attributive.
2. E. *No right action is inexpedient*—Universal Negative.
3. I. *Some muscles act without our volition*—Particular Affirmative Attributive.
4. O. *Some plants do not grow in the tropics*—Particular Negative.
5. U. *Common salt is chloride of sodium*—Universal Affirmative Substitutive.
6. Y. *Some stars are all the planets*—Particular Affirmative Substitutive.

§ 382. In what may be regarded as his final logical doctrine, Hamilton explains, first of all, the nature of Affirmation and Negation. Affirmation means inclusion, and absolute affirmation absolute inclusion. The subject in this case is definite. It is *this* or *all*,—the individual or the class of individuals. We say, *this man is tall*; *all planets are stars*. Negation, on the other hand, is exclusion; and absolute negation is absolute exclusion. We say, *this man is not a European*; *all plant is not any animal*; *no plant is an animal*.

Looking merely to the class-notion, affirmation proceeds downwards or inwards from the greatest to the least, from the whole to the parts. Negation proceeds upwards or outwards from the least to the greatest, from the parts to the whole. Thus we say *all A is B*, or *A contains the part B*. On the other hand, we say *any A is not any B*, or taking *any one A*—the least—it is not *any one B*, even though you go through the whole class B, or accumulate all the Bs to confront it. *Any man—any one—is not any horse*, even suppose all the class horse is examined or brought to confront the one man, or any one man.

At the maximum of Breadth, affirmation predicates the least of the most,—the fewest attributes of the greatest number of things; as, *Man is or exists—animal is organised*.

Negation, again, here says the most of the least. It withdraws the greatest number of attributes from the fewest things.

At the maximum of Depth, affirmation says the most of the least,—it predicates the greatest number of attributes of the individual. *Man is living, sentient, rational, organised*. Negation here says the least of the most,—it withdraws the fewest attributes from the greatest number of things.¹

§ 383. In ordinary language, Negation is a privative or correlative act—that is, it supposes an affirmation or inclusion which it reverses. We deny what has been affirmed. But here we must distinguish between *all*, and *not any*. The former, *all*, we use in universal affirmatives, and we say *all is*, *all are*. This may mean *the whole*, collectively; or *every, each, each several*, distributively. When we deny a universal affirmative, so expressed, as *all As are Bs*, we assert that *some are not*; when we deny that *all the men in the ship were drowned*, we assert that *some were not*. In the same way, when we deny

¹ *Discussions*, p. 680.

that *all the men in the ship were not drowned*, we affirm that some were.

To avoid this ambiguity, the proper logical predesignation in universal negation is *not any* (*none*), *is*. *All* are thus excluded, through the non-inclusion of *any*. *Any stone is not any plant*; *any A is not any B*; *any one of the persons accused of this theft is not any one of those guilty*; or *none—not one—of them is guilty*.

§ 384. It should be noted that *any* is not properly adapted to affirmation, but only to negation. It is the same with *ullus*, and means primarily (*even*) *one*, (*even*) *the least or fewest*. It ranges from least to greatest—from the non-inclusion of the least to the exclusion of the whole. *Any one is not*,—thus *all are not*. We can say, *the whole (or class) triangle is the whole (or class) trilateral*; or, *every (or each several) triangle is every (or each several) trilateral*. If we were to say, *any triangle is any trilateral*, we should speak nonsense, confounding every triangle with every other. Or if we were to say *some one X is any one Y*—that is, *some one figure is any one triangle*, *some one animal is any one man*—we should say what is absurd in terms, and we should not express what the proposition is intended to mean. *Any* is contained under *some*, as the genus. *Any, any one*, must always be *some*; *some* is not always *any*.¹

§ 385. Hamilton has analysed anew the doctrine of particular quantity, and formally introduced into Logic a new meaning of the designation *some*. In the ordinary or Aristotelic logic, *some* means, in affirmatives, *some at least—some, perhaps all*. *Some* itself here is indefinite, but it does not definitely exclude *all*. In negatives, *not some* means *not some at least, not some perhaps none*. *Not some* is itself thus indefinite, but it does not definitely exclude *not any*, or *none*. This sense of *some*,—*some at least*—Hamilton names *Indefinite Definitude*. But there is another meaning of *some*. It may mean, in affirmatives, *some at most, —some not all—some only*. *Some* itself is here indefinite, but it is definitely exclusive of *all*. In negatives, *not some* means *not some at most—not some and yet not none—not some only*. The *not some* is itself indefinite, but it is definitely exclusive of *not any* or *none*. This meaning of *some*—*some at most*—Hamilton names *Definite Indefinitude*.

¹ *Discussions*, p. 683.

§ 386. Hamilton holds that the latter meaning of *some*—*some at most*, or *some only*—is the more prominent in ordinary thought, and language; while the former—*some at least*—is a mere accident, depending on our ignorance in special cases. Every quantity is necessarily either *all*, or *none*, or *some*. The third is formally exclusive of the other two. *Some only* excludes equally *all* and *none*. Aristotle confounded what was indefinitely thought, with what was thought as indefinite, and thus hindered the scientific development of the logical theory of propositions. Hamilton would thus introduce *some only* into the theory of propositions, without, however, discarding the meaning of *some at least*. On this principle he has constructed a table of the mutual relations of the Eight Propositional forms on either system of particularity. This shows what propositions are impossible (inconsistent, contrary, contradictory), and what yield immediate inferences (integration, restriction).¹ It is thus not correct to say, as has been said, that Hamilton discarded the ordinary logical meaning of *some*. He simply supplemented it by introducing into the propositional forms that of *some only*.

§ 387. But there may be a question as to whether *some only* is equally fundamental with *some at least*. I rather think it is not. It is quite clear that I can speak of *some at least*, without advancing to the more definite stage of *some only*. I may know that *all the metals are at least conductors*—that is, *some conductors*—without knowing that they are *some only*,—if this should chance to be true. *Some at least* does not imply *some only*; but *some only* implies *some at least*, and more. It implies *some at least are*, and *some at most are*.

No doubt there is an inference from *some only* to *some other*. *Some only* is, therefore, *some other* is not. *Only some of the As are Bs*; therefore *some other of the As are not Bs*; or *there are other As which are not Bs*. But before I can speak of *some only*, must I not have formed two judgments,—the one that *some are*, the other that *others of the same class are not*? *Only some* presupposes this, or these judgments. The integration, then, is rather a re-integration,—it is a filling up of what I have already thought or determined,—of what I have already presented only in part. The *some only* would thus appear as the composite of two propositions already

¹ *Discussions*, p. 692.

formed—first, that *some are*; secondly, that *some (others of the class) are not*. It seems to me that we must, first of all, work out logical principles on the indefinite meaning of *some at least*. This is the primary requisite and meaning of affirmation—the least possible—in dealing with a class. *Some only*, as appears to me, is a secondary and derivative judgment. Still this need not interfere with the recognition of the meaning in propositions. Nor does it make it less a single judgment, after the process of formation has been completed. It is then no more a double judgment than *all are*; and, like it, may appear as a single premiss in a reasoning.

§ 388. There can be no doubt of the common use of this definite meaning of *some* in ordinary thought and speech. When I say, *some of the men in the ship were drowned*, I naturally mean *only some*; I oppose this definite particularity to *all*,—*all the men in the ship were drowned*. I should not, in this connection, naturally say, *some of the men in the ship were not drowned*. The positive element in the occurrence is that to which I should naturally refer; and in wishing to express that all were not, I should say *some were*,—that is, *only some were*.

(a) "I saw some of your children to-day." These words, according to Mill, do not mean that I saw some only. But we are led to infer that they do, because it is most likely, if I had seen them all, that I should have said so; "and it is further presupposed that I must have known whether the children I saw were all or not." Any tyro in Logic would say in reply to this, that if I say I saw *some*, I must mean not all, but only *some*, in whatever way I may have come to know this. Logic begins with the assertion made, and demands its explicit meaning. Is it conceivable that even Mill could have imagined that *some*, said of what had been seen, might mean *more* than the *some* seen? or that the *some* expressed did not exclude *all*?

(b) In Greek we have a means of distinguishing the *some* and *some*. In the case of an individual object, say in space, we have one part of the object distinguished from the other by a definite form of expression. Thus, if we only mean to speak of *the middle market-place*, we should say *ἡ μέση ἀγορά*; but if of *the middle of the market-place*, we should say, *ἡ ἀγορὰ μέση*. So *τὸ ἔσχατον ὄρος* means *the outmost mountain*, but *ἔσχατον τὸ ὄρος* means *the outmost part of the mountain*.—(Clyde's *Greek Syntax*, p. 21.) This is simply the *some* and *some*, or the *some* and *some* not of the logical conception *ὁ μὲν . . . ὁ δέ*. These may express opposition; they also often express different or divided parts of the same thing—portions of the same class—the *one*, the *other*, *hic* and *illic*—as this species and that species of the same class—in logical form *some* and *some (other) (of organisms)*.

"In English, as in Greek, the attributive formula marks a distinction of persons and things, whereas the predicative formula marks a distinction of conditions in the same person or thing. *The stone is soft here*, ἡ πέτρα μαλακή ἐστὶν ἐνταῦθα, is predicative; *the soft stone is here*, ἡ μαλακή πέτρα ἐστὶν ἐνταῦθα, is attributive—marking a difference in the kind of stone. *I see the mountains white* (predicative); *I see the white mountains* (attributive)."—(Clyde's *Greek Syntax*, p. 19.)

(c) Laurentius Valla, long ago, vindicated the practical use of the bi-particular proposition (propositio biparticularis)—*some is not some*. "Non totus orbis," he said, "paruit Alexandro," i.e., "pars orbis paruit, pars non paruit." So "tota Græcia non paruit Alexandro," i.e., "non tota Græcia." This was a distinct and formal anticipation, as well as vindication, of the necessity for thought and expression of the *some* and the *some not* in reference to the same class.—(See *Dialectica*, c. xxvi.)

CHAPTER XXIV.

OBJECTIONS TO QUANTIFIED PROPOSITIONAL FORMS—GENERAL
CONSEQUENCES OF QUANTIFICATION OF PREDICATE.

§ 389. It has been urged, that if we expressly quantify the predicate, we shall have a form or formula of judgment which is a simple répétition or tautology. This criticism must be held to be taken to the form of the proposition in Extension. Indeed, those who urge it seem utterly ignorant of any other form of proposition. In Comprehension, as we have seen, the predicate as attribute is, in affirmatives, necessarily taken in its totality, as an indivisible unity. No attribute is properly divisible, and is thus necessarily taken in its integrity. When we say *A is B*, or *the river runs*, the attribute is taken wholly or completely, but it could not be represented in the formula *A is A B*, *the river is the river running*. This is a different statement from *the river runs*, or has this particular mark. *Gold is soluble in aquafortis*—does not mean *that gold is gold soluble in aquafortis*; for we are speaking of *gold* itself, and we have added a mark, and until the mark has been added it is not, to begin with, *gold soluble in aquafortis*. *The Black Watch were the first in the breach*, does not mean *that the Black Watch were the Black Watch first in the breach*; for this is precisely what we have to add to what the Black Watch already is or is known to be.

§ 390. In any affirmative judgment, we necessarily, in thought, quantify the predicate to the full extent of the subject. *A is B*, means *A is some B at least*; or *B is in A, all or some A*; *man is organised*—that is, *some part of the class at least, or organised is in A, all or some*. If, therefore, the criticism have any force at all, it must imply that in every such

judgment, whether the predicate be expressly quantified or not, the meaning is *A is A B*; and it is thus not an objection, even if it be an objection at all, to the express quantification of the predicate but to the judgment as thought—that is, to the judgment as a judgment.

§ 391. But suppose the predicate expressly quantified, as *A is (some) B—water is a (some) useful thing*,—does this mean only or at all that *A is A B*, or *water is water useful*? In no way whatever. It means simply, that taking the two concepts or classes of things represented by *A* and *B*, *water* and *useful*, the subject is a part at least, some at least, of the predicate class, but whether all, or how far short of all, we cannot tell. *Water* and *water useful* are quite distinct concepts; we are speaking of the former, not of the latter. *Useful water* is not the subject of which I speak, but *water*; and these are two very different things. The extent of *useful*, of which I speak, is limited to the extent of the subject—*water*; but I am still speaking of water, not merely of *useful water*, and I am not repeating what I said in the subject, but adding to it—specifying and relating it to a class which may or may not be coextensive with it. *The oak is a deciduous tree*—that is, *some part of the deciduous*. *The oak is the oak deciduous*, are wholly different propositions—not the least of the same import. *All equilateral is (all) equiangular*,—the totality in the one case is convertible with that in the other; but *all equilateral is equilateral-equiangular*, does not assure me of the convertibility of the subject and predicate.

§ 392. It is further contended, that in the case of the express quantification of the predicate, the subject should be qualified (!) by the predicate. Why we are not told, nor what qualified judgment means in such a case. But it seems that if we say *all man is some mortal*, we ought to say *all man is man mortal*, and then *man mortal is man mortal*; or *A is B*, then *A B is A B*. I submit there is no equivalence in those statements or propositions, no necessary connection between them. When I say *all man is some mortal*, I am speaking of the class *man* and the whole class *man*. But when I say *man mortal*, or *mortal man* are so and so, I speak of a part of the class *man*—viz., *the mortal part*, and I imply that there is or may be another part of which I am not speaking at all—viz., *the non-mortal or immortal part*. The one is a universal proposition

in which I speak of the whole subject; the other is a particular proposition, in which I speak only of some of the class, a supposed part of the subject. To say that *the violet is blue*, is not the same as to say that *the blue violet is the blue violet*. In the former case I am supposed to speak of all the class *violet*, and to say it is blue; in the latter case I am supposed to take a part of the class by restriction—viz., the *blue violet*, and to say simply that it is identical with itself. This arises from the elementary principle that any adjective applied to a subject is limitative. *Mortal man* is necessarily less than *all man*, and *blue violet* is necessarily less than *all violet* or all of the class. Hence to say that *all* of one class is equivalent to *some* of another or possibly wider class, is one thing; but when I say *man mortal is man mortal*, this does not tell me that I am speaking of the whole of the subject, and the proposition is not the convertible equivalent of *all man is some mortal*. It is simply a narrower proposition, and at the utmost a puerile verbal inference from it, which depends on the wider proposition.

But if the *some* in the predicate means *some only*, which it might do, the attempted equation of the two propositions is even ludicrous. *All men are (only some) mortal*, cannot be translated into *all men are men mortal*,—for this does not in the least tell me what I said originally that *all men* do not exhaust the class *mortal*, but are only a part of it. And to put *men mortal* for the predicate *all men*, is merely to repeat the blunder already exposed.

The formula becomes even more inappropriate when the subject and predicate are each universally quantified. We may say, *all the men at the bar are all the rioters*. This, according to the formula, should be, *all the men at the bar are the men at the bar-rioters*. And this paltry tautology is actually to be regarded as representing the statement made in the original proposition!

Again, let us take such a proposition as *some stars are all the planets*. Here, according to the formula, we ought to mean *some stars are star-planets*—which is pretty well nonsensical, and certainly not in the least the equivalent of the original proposition.

§ 393. The criticism, indeed, proceeds on the confusion of the Comprehensive and Extensive Predicates.

(1.) In regard to concepts,—when we translate *man is some mortal*, into *man is man mortal*,—we pass from the predicate in extension to that in comprehension—from what has quantity to what has none, but is indivisible. The *some mortal* of the first proposition indicates the limited place of the subject in the class; the *man mortal* of the other clumsily indicates *mortality* as an attribute of *man*. Instead of saying this simply, we say *man is man (the) mortal*, or *man is the (or a) subject which possesses the mark mortal*. To pass from the comprehensive predicate to the extensive is natural and legitimate; to repass from the extensive to the comprehensive is arbitrary and wholly unnecessary, and it does not proceed on any equivalence of quantity; for we really pass from what has quantity to what has none—from extension to comprehension.

To take an individual subject:—*Simon is a tanner*—that is, *one of the tanners or class*. If, however, we thus quantify the predicate, we ought, on the principle stated above, to have this form—*Simon is Simon tanner*, as *man is man mortal*. Now this is not the equivalent of the original proposition at all. This means that of those named *Simon*, the one of whom I now speak is *tanner*, or *the tanner*, as opposed to *Simon the miller* or *butcher*, or some one else of the same name. He is marked, in fact, by an attribute as one of the Simons; whereas, when I say *Simon is a tanner*, or *one of the class*, I am not considering whether there are other Simons, but only that he is one or a part of a definite class. He is in the class, but does not necessarily exhaust the whole extension. The proposition, *Simon is Simon (the) tanner*, is in Comprehension as giving the mark of the individual; the proposition, *Simon is a tanner*, is in Extension, and gives the place of the subject in the class.

§ 394. Objections have been made to the scientific validity of certain of the Propositional Forms:—

(1.) Toto-total affirmation. *All is all. All X is all Y.* It is objected by De Morgan—

(1) This is complex. (2) It cannot be denied by a simple proposition.

(1.) It is complex; and *all Xs are Ys* is compounded of *all Xs are some Ys*, and *some Xs are all Ys*.

(a) *All Xs are all Ys* is not more complex than its alleged constituents—*all Xs are some Ys*, or *some Xs are all Ys*. One

quantity cannot be more complex than another. *All* is not compound, while *some* is simple. The truth is that *some* is made up of *several*, as *this*, *that*, &c., just as *all* is made up of *every one*. It is the business of Logic to consider a judgment as a completed or finished product. The psychological complexity of the judgment is a wholly different point. Moreover, to admit that *some is all*—*some figure is all triangle*—is simple, renders it impossible to conceive that *all is all*, or *all triangle is all trilateral*, is compound. *All* and *some* are both made up of a plurality. The attempt has been made to show the composition in question, on the ground that the propositions which make up *all X is all Y*—viz., *all X is Y*, and *all Y is X*, are independent of each other; while the propositions which make up *all X is some Y*—viz., *all X is Y*, and *some Y is X*, are not, the one being inferrible from the other by conversion. But when we find that this proceeds on the assumption (1) that the predicate as predicate has no quantity, and (2) nevertheless, that in conversion the quantity acquired is particular when the convertend is affirmative, and universal when it is negative, we need not argue the point. If the predicate in the convertend had no quantity, and yet acquired it in the conversion, the acquisition was at once arbitrary and illogical.

§ 395. (b) *All Xs are all Ys* is said to be compounded of two propositions—viz., *all Xs are some Ys*, and *some Xs are all Ys*. In concrete language, *all triangle is all trilateral*, is said to be made up of *all triangle is some trilateral*—*some triangle is all trilateral*. But these are incompatible propositions. If either of them is true, the other is false. Nay, if either of these alleged generating propositions be true, the so-called product, *all triangle is all trilateral*, is false. Here *some* is used in the sense of *some only*. *All triangle is (only some) trilateral* is contradictory of *(only some) triangle is all trilateral*; and either of these is contradictory of *all triangle is all trilateral*. Nor can it be shown that this form AfA is made up of these two forms, even if we take *some* in the ordinary Aristotelic sense of *some at least*. Thus (a) *all triangle is some at least trilateral*; and (b) *some at least of triangle is all trilateral*. For the quantity of the predicate in (a) is wholly indefinite, and the quantity of the subject in (b) is wholly indefinite, and the two

indefinites put together cannot logically yield the definitude or totality of the same subject and the same predicate in a conclusion. Thus:—

(a) *All triangle is (some) trilateral.*

(b) *(Some) triangle is all trilateral.*

(c) *All triangle is all trilateral.*

All triangle is some trilateral at least, perhaps all, how much I know not; some triangle at least, how much I know not, is all trilateral. These propositions are vague, even if they were consistent, and cannot form the elements of the compound, *all triangle is all trilateral.*¹

(2) The objection that *all X is all Y, all man is all mortal*, cannot be denied by a simple proposition, is groundless. We can say readily *the whole class man is not identical with the whole class mortal*. That is all we need to say in order to deny, and it is conveyed in one proposition.

The denial here is perfectly definite. We deny the equivalence of the terms as wholes. It is said by De Morgan that such a proposition *all X is all Y*, can be denied only by the disjunctive assertion, "Either no *Xs* are some *Ys*, or some *Xs* are no *Ys*." Though one of these were true, the power of denying *all is all* in an elementary form is refused me.

Hamilton, in dealing with this objection, shows that De Morgan does not distinguish contrary from contradictory denial. In contrary opposition the original statement may be denied by a plurality of propositions. A denial need not rest on a single alternative case—on a contradictory proposition—but on one or other of two impossible contraries, and it will be valid if one or other of the contraries be true.

"*All (class, whole, every, &c.) triangle is all (class; whole, every, &c.) trilateral*, is contradictorily denied by the proposition. *All (class, &c.) triangle—is not—all (class, &c.) trilateral*, in the sense 'This proposition, *All triangle is all trilateral*, is untrue.' The denial here is necessarily vague, for there are five several cases, any of which it may mean, and of these *any* will validly support the negation of the affirmative proposition. These are: 1°, *Not-all triangle is all trilateral*,—i.e., *Some triangle is all trilateral*. 2°, *All triangle is not-all trilateral*,—i.e., *All triangle is some trilateral*. These are inconsistent. The following are contraries—viz., 3°, *No*

¹ Cf. Hamilton, *Discussions*, p. 688.

*triangle is any trilateral. 4°, Some triangle is no trilateral. 5°, No triangle is some trilateral."*¹

All that needs to be done in the case seems to me to make such a denial as will affect the equality of the two classes,—that is, the point asserted. An antagonist does not require to do more in the first instance. The special proof or opposite case on which he relies is a secondary point. If it be said,—*all the men at the bar were all the men in the field*, I can deny this by saying this was not so. I may yet hold my proof in reserve. I may be able to show that one man in the field leaped the wall and escaped, or that one of the men at the bar was not in the field at all, or that none of the men at the bar was in the field, and so on. Either of these alternative cases would disprove the assertion,—that is, the equivalence of subject and predicate alleged. I can legitimately make a contradictory negation in the first place, though this in the end may depend on the truth of one or other of several alternatives.

§ 396. The use of the form, *all is all*, is common and necessary. Every adequate Definition supposes it. If I say *proportion is the similitude of ratios*, then, the definition being accepted, the predicate can be put in the place of the subject, and nothing else. This is simply AfA. And surely, if I can think the subject and predicate of a definition—nay, must think them as precisely convertible, it is ridiculous to suppose that I cannot express this in a single propositional form,—that I am to be called upon to define, and then in another proposition to say this is a good definition, or its terms are convertible. The form is further obviously necessary and useful in expressing equivalence between two undivided wholes, as *copper is sulphate of iron*—that is, *all of the one is all of the other*. *Common salt is chloride of sodium*, and so on. In ordinary language we do, wherever it is necessary, attach a sign of universality to the predicate by limitative and exceptive particles. We say, *God alone is good*; *Virtue is the only nobility*; *Of animals man alone is rational*. We use besides *one, only, precisely, just, sole, &c.*

§ 397. In Induction and in practical reasoning, the need of the form is obvious. As Professor Bowen well illustrates this

¹ *Discussions*, p. 689 et seq.

point: "If I am playing chess, and my king is in fatal check, I must reason thus—I can neither move my king, nor interpose a man, nor capture the attacking piece. But these are all the modes of obviating check. Then I am checkmated."¹

(α) "*All A is all B* is inadmissible, because it is not the equivalent of any single proposition capable of being asserted in an unquantified form."—(*Examination*, p. 514.) It is the equivalent of two separate judgments, *All As are Bs*, and *all Bs are As*. *All man is all rational*. This means, *every man has the attribute reason*, and *nothing which is not man has that attribute*. It is not possible to make only one judgment out of an assertion divisible into two parts, one of which may be known and the other unknown."—(*Ibid.*, p. 515.)

"Unless Sir W. Hamilton was prepared to maintain that, whenever the universal converse of an universal affirmative proposition would be true, we cannot know the one without knowing the other, it is in vain for him to contend that a form which asserts both of them at once is only one proposition. . . . If 'all equilateral triangles are all equiangular,' is only one judgment, what is the proposition that all equilateral triangles are equiangular? Is it half a judgment?"—(*Ibid.*)





In the first place, *all A is all B*, or *all man is all rational*, does not mean what Mill says it means. It is a judgment of quantity—equivalence in quantity, and not directly in quality at all. It is a judgment of two convertible totalities, not merely of equivalence in attributes. In the second place, the argument amounts to this, that *all A is all B* is a compound proposition, and therefore is not admissible as one propositional form. Without referring expressly to the test of the proposition as compound given by Mill, his argument is futile; for if it held good, no proposition would be admissible as one propositional form except a Singular Judgment. This is the only proposition which is strictly indivisible—its subject being an indivisible unit,—*one, this, that*. Every other proposition, whether the subject be quantified as *some* or *all*, would in this case be compound and inadmissible as a single propositional form. *Some* is compound of *several* units, *all* is made up of *every* unit of the class. *Some men are just*, *all metals are conductors*, are in this case compound propositions. And it matters nothing, so far as this point is concerned, whether we also speak of *all* in the predicate. We may say, *Some stars are all the planets*, or *all equilateral is all equiangular*. These propositions are not, in principle, more compound than *all the planets are stars*, or *all equilateral is equiangular*. Mill, in fact, confuses the process of the psychological formation of judgments with its logical results. The logical unit, whether concept or judgment, is necessarily compound, but it still remains and can be dealt with as a logical unit. And the propositions which Mill regards as compound, because they are "divisible into two parts, one of which may be known and the other unknown," are not more compound than those which he regards as single. We may know that *some metals are electrical* without knowing that *all are*, though we cannot make this assertion without knowing

¹ *Logic*, p. 134.

the former; just as we may know that *all equilateral is (some) equiangular*, without knowing that they are *all equiangular*, though we cannot know this without knowing the former. No doubt, whatever proposition is capable of division into two separate assertions, one of which may be true or assumed without involving the other, is psychologically a compound proposition; but this applies to every proposition except the Singular, whose subject is logically an indivisible unit.

(b) "*Some A is some B, i.e., only some B*, is a double proposition, compounded of *some A is some B* and *some (other) A is not any B*. The one statement affirms, the other denies, a different predicate of a different subject, and these are, therefore, two distinct judgments."—(*Examination*, p. 517.) Do they really? (*Some man is (only some) of the six-foot things—(some) (other) man is not any of the six-foot things*. Does the subject *man* differ because we speak of *some* and *some other* of the class? Does the predicate, *six-foot things*, differ because we speak of *some* and *any* of the class? Are we not still dealing with the same genus in each case, and simply subdividing it? And even if this were true, would this prove the judgment with *some only* in it to be any more compound than that *all A is some B* implies the foregoing judgment that *some (at least) are*?

(c) "*All Xs are all Ys*," says De Morgan, is compounded of "*all Xs are some Ys*," and "*some Xs are all Ys*." No, replies Hamilton—these are incompatible,—mutually exclusive. They cannot unite to form one proposition. X cannot be thought both as only some Y, and as all or every Y. Mill rejoins: yes; for if *all Xs are some Ys* identifies X with only some Y, *some Xs are all Ys* "superadds the remainder"!—(*Examination*, p. 516.) In other words, we first say *X is only some Y*, and then we say no, it is the whole of Y. We thus make one proposition—*every X is every Y*. *Some only* may mean more than *some only*!

§ 398. But Hamilton answered this and other objections by anticipation. To the objection that in Reciprocating propositions the predicate is taken in its full extent, *vi materiæ*, Hamilton replies, "that as form is merely the necessity of thought, it is as easy to think two notions as toto-totally coinciding (say, *triangle* and *trilateral*) as two notions toto-partially, and parti-totally coinciding, say, *triangle* and *figure*. Accordingly we can equally abstractly represent their relations both by geometric quantities (lines or figures) and by purely logical symbols. Taking lines:—the former ; the latter . Taking the symbols: the former C: : F; the latter A, : B.—But if the reciprocation were determined by the mere matter, by the object contingently thought about, all abstract representation would be impossible." ¹

¹ *Logic*, ii. Appendix, p. 297.

§ 399. The objection made by Thomson to the forms AnI and InI, is that they have the semblance but not the power of a denial, is unfounded. To take AnI.

If we say, *any bird is not some animal*, we can still say, *any bird is some animal*. This is no proper objection to the original form, for the *some animal* spoken of in the two propositions is different. In fact, we are dividing a class or genus into its parts and species. We suppose *animal* the genus, and divide it into *some* and *some*. These are exclusive, and yet possess a common quality. *All roses are some flowering shrubs*, and *all roses are not some flowering shrubs*—that is, flowering shrubs contain roses and some other shrubs. As Professor Bowen has well remarked: "Any limitation of the predicated class by a limiting adjective is equivalent to quantifying that predicate particularly. *Pines are not deciduous trees*—that is, *pines are not some trees*."¹

§ 400. The same principle justifies parti-partial negation—InI—*Some is not some*.

The peculiar use of this form is to express the divisibility of any whole. When we say, *some A is not some A*, we assert parts, and that these can be divided, or that there are parts and parts. If we deny this statement, we assert that the thing spoken of is indivisible or a unity. This form is implicitly at work in every science—in every case, in fact, in which we divide a genus into its species, or a species into sub-species, or those, again, into individuals. When we speak of *some* and *other men*, for example, we have presupposed this form that *some is not some*—that the class *man* is capable of division, capable of being sundered and separated, and yet remaining the supreme whole which contains *the some* and *the other*—say, *the European* and *the Asiatic*. We may say there are men and men. We say, as we do every day, there are politicians and politicians, there are ecclesiastics and ecclesiastics, there are sermons and sermons. These are but covert forms of the *some is not some*, and unless this is formally vindicable, the greater part of our ordinary language is wholly baseless in reason.²

§ 401. Is *some is not some* not an available proposition? May I not say—do I not need to say—*planting is not some planting*? *Planting monotonous larches all over a hillside is*

¹ *Logic*, p. 189.

² Cf. *Discussions*, p. 695 et seq.

not planting the same with graceful birches. Planting in one sort of way is not planting in another sort of way. And yet both are planting. Only the one is good, the other bad. And if I can state this propositionally, why may it not appear in a reasoning? Again, *some vivisection is not vivisection.* This is nonsense; but *some vivisection is not some vivisection,* is true and important; for the one may be with an anæsthetic, the other without it.

§ 402. There are objections against their scientific and practical necessity. (1.) *Some X is all Y*—IfA. This is merely a new mode of expressing $A\text{fi}\neg A$, *all X is some Y*; for we can convert $A\text{fi}$ into $\text{If}A$ —and say *all X is some Y*, and *some Y is all X*. So with $A\text{ni}$ and $\text{In}A$ —*any X is not some Y*—*some Y is not any X*. These are thus virtually identical forms, and the new ones, $\text{If}A$ and $\text{In}A$, are, though valid, not scientifically or practically necessary.

That *some stars are all the planets*, and *all the planets are some stars*, are no doubt deducible directly the one from the other. But that does not bear on the point, that the logical doctrine of the universal particularity of the predicate in an affirmative proposition, is by the admitted legitimacy of $\text{If}A$ at once disproved, as that of the invariable universality of the predicate in a negative proposition is equally disproved by the admitted legitimacy of $A\text{ni}$. And if these forms be legitimate, their scientific value in reasoning is at once vindicated, and we can now employ these propositions as premisses, and draw conclusions directly from them. This we could not do before on the ordinary logical principles, being driven to the circuitous process of reduction in order to reach what is now a direct conclusion. And being thus both legitimate and valuable in a scientific aspect, it may happen practically that we approach the knowledge of the proposition through the new form—*Some stars are all the planets*, or *all A is not some Y*—rather than in the old. This being so, there is no reason why we should be debarred from their direct use, and be made to state each in the form of an equivalent.¹

§ 403. Among the consequences of the doctrine of the quantified predicate, we note (1) propositions become equations or non-equations of subject and predicate. They are equations or non-equations in quantity proper—that of Extension;

¹ For further vindication, see *Discussions*, p. 662 et seq.

for, as I have said, quantification of the predicate does not and cannot apply to comprehension. All the same this relation of equation need not abolish the relation of whole and part.

(a) It has been supposed that when Hamilton said "every proposition expresses an equation between its subject and its predicate," he meant to speak of the terms taken absolutely, or each regarded for itself.—(Cf. St Hilaire, art. *Proposition Dict. de S.P.*) Hamilton has no such meaning. He refers merely to the proposition in question, to the proposition as determinate; as far as it expresses the quantity of the terms. This is shown by the very nature of explicit quantification; for example, *all man is some mortal*. By this he does not mean an equation absolutely between the terms *man* and *mortal*, but only between as much of them as is taken or considered—in the one case *all*, and in the other *some*. It is not that all terms are equivalent or identical, but that the proposition expresses how far they are so.

It is actually objected by the same writer that the idea of equation is inapplicable to negative propositions, as if Hamilton had not repeatedly and expressly said that the relation is one either of equation or non-equation.

(b) Hamilton nowhere says that "every proposition which I affirm respecting a subject must include all I know about it," and therefore, that if I know all trilateral figures to be triangular, I must say not "all triangles are trilateral" but "all triangles are all trilateral."—(*Examination*, p. 516.) What Hamilton says is, that what I know, judge, and mean to say in a propositional form—in language—I should say expressly, that it may be clear to myself and others, and that logical science may unambiguously deal with it. If, for example, I mean merely to state that the predicate extends to all of the subject, I should say *all trilateral is triangular*; and if I mean to say that it is coextensive with it, and not more, I should say *all trilateral is all triangular*.

(2.) Propositions (in extension) are seen to be immediately convertible. The predicate can be immediately put in the place of the subject, and a proposition of precisely the same force or import emerges. The various methods of Conversion devised by logicians are thus abolished, and all conversion becomes absolutely simple, and by a single method—mere transposition of the terms,—as *every A is (some) B*; *some B is every A*; *any A is not (some) B*; *some B is not any A*.

§ 404. The scientific value of the quantification of the predicate is, in Hamilton's view, shown expressly in regard to Syllogism. Its necessity and logical importance are vindicated by the fact that it is really assumed in the ordinary syllogistic view, though not acknowledged—in fact, repudiated.

In the First Figure, there is the acknowledged peculiarity of indirect moods—such as *Bamalip*, *Celanes*, *Dabitis*, *Fapesmo*, *Frisismo*. These moods, as well as all the moods of the Fourth Figure, are simply sub-conclusions from the direct conclusions of the premisses employed. There is the secret conversion of the undeclared direct conclusion. But there is the further peculiarity, not acknowledged, that these indirect conclusions are immediate inferences from a proposition which, on the ordinary logical doctrine, is illegitimate—viz., a negative proposition with a particular predicate (*AnI*, *InA*.) To take *Fesapo*, for instance :—

No planet is (any) comet ; (AnA).

All comets are some (stars) revolving round the sun ; (AfI).

(∴ No planet is some star revolving round the sun) ; AnI.

∴ Some stars revolving round the sun are no planets ; (InA).

The proposition within brackets, *AnI*, is the immediate, though undeclared, conclusion from the premisses. The last proposition, *InA*, is merely an inference from this immediate conclusion. The logicians are thus here obliged to acknowledge as efficient in thought a judgment which they regard as illogical—viz., the negative with a particular predicate (*AnI*). For the converse of this proposition cannot be true or legitimate, unless it is so itself. The contracted views of logicians as to the indefinite quantification of the negative predicate are thus refuted by their own practice. The general result of this analysis is that all the indirect moods of the first figure, and all the moods of the fourth, are only mediate conclusions from moods (or conjugations) of the first figure. Consequently there is no ground for maintaining a fourth figure at all. The conclusion of each of the indirect moods of the first figure is simply a process of conversion from one quantity into another; the moods of the fourth figure are merely the indirect moods of the first figure, the premisses being held to be transposed—a circumstance which can cause no syllogistic difference.¹

§ 405. While, since the time of the Port-Royalists, the doctrine of Comprehension has been recognised and received into logical systems, it seems to me that the salient and essential feature of the doctrine in its relation to judgments has either been generally overlooked, or when noticed at all most im-

¹ *Discussions*, p. 663.

perfectly appreciated. This is the individuality or totality of the attribute as predicate,—which gives an entirely new and yet natural form of proposition and series of propositional forms. In regard to these, quantity is of no consequence; it falls out of consideration.

§ 406. This new classification of propositions is formally legitimate, and is at the same time suitable to the actual facts of our experience and the needs of our thought. Taking Comprehension first as the basis of the whole, we have:—

A. *All man is mortal* (indivisible attribute or mark);

∴ *Mortal is a mark of all man.*

E. *No man is quadruped*;

∴ *Quadruped is not a mark of any man.*

I. *Some man is learned*;

∴ *Learning is a mark of some man.*

O. *Some man is not learned*;

∴ *Learning is not a mark of some man.*

U¹. *This man is artist*;

∴ *Artist is a mark of this man.*

U². *This man is not an assassin*;

∴ *Assassin is not a mark of this man.*

In each predicate there is quality, not quantity. The judgment is simple, natural, and easy; it is suitable to experience; it is simply convertible, and may be expressed in either form—as convertend or converse. To distinguish such propositional forms, we might call them—A *Comp.*, E *Comp.*, I *Comp.*, O *Comp.*, U *Comp.*¹, U *Comp.*²

It is to be observed that the predicate (attribute) is taken in its whole comprehension, whether the judgment be affirmative or negative. When we say *this man is not an assassin*, we speak of the whole comprehension of the concept, as marked off from every other, either fuller or less in comprehension. We do not deny anything of him, except the complete whole essentially involved in the concept *assassin*. He may be *homicide*, or he may not; but this is neither (implicitly) affirmed nor denied in our judgment.

§ 407. In Extension, the following will be the scheme of forms:—

- A¹. All man is (some) mortal.
 A². All man is (all) risible.
 E¹. Any man is not (any) stone.
 E². Any man is not (some) biped.
 I. Some man is (some) biped.
 O¹. Some man is not (any) happy.
 O². Some man is not (some) biped.
 U¹. This man is not a thief (any).
 U². This man is not biped (some).

These may be marked :—A Ex.¹, A Ex.²; E Ex.¹, E Ex.²; I Ex.; O Ex.¹, O Ex.²; U Ex.¹, U Ex.².

(a) The Port Royal Logicians were really the first to give effective prominence to the distinction between Extension and Comprehension in Notions and Propositions. But there are references to the distinction by other writers, before and after the date of the Port Royal Logic (1662). To say nothing meanwhile of the obvious references to the distinction in Aristotle himself, we have its apprehension and statement by Cardinal Cajetan in 1496.—(See *Port Royal Logic*, Introd. p. 33.)

Collection of many is twofold; *intensively*, and thus the species is more collective, because it rather unites the *adunatu*; *extensively*, and thus the genus is more collective, because many more fall under its unification (*adunatione*) than under the compass (*ambitu*) of the species. The species and genus are like generals—the one of which has a small army, but wholly unanimous; the other great, but of diverse factions. For that collects more intensively, this more extensively. Porphyry speaks of the extensive collection, and therefore says the genus is more collective.—(Cajetanus in *Porph. De Genere et Specie*.)

The species is in itself more one than the genus, since the species expresses a nature absolutely indivisible formally, whence it is called *atoma*; but the genus imports a nature divisible.—(Cajetanus in *Porph. De Genere et Specie*, quoted by Stahl, *Regule Philosophicæ*, Tit. xii. Reg. v., p. 381: London, 1672; first ed. 1635.)

(b) Avicenna had said—Predication is of two sorts, either univocal or denominative. *Socrates is a man*, is univocal. Here there is true and univocal predication. *Man is white*, or *man has whiteness*,—this is denominative. *Man* is not said to be *whiteness*; as *Socrates* is said to be *man*.—(*Log.*, p. 3 v. B.; Prantl, ii. p. 325.)

(c) The universal which Logic examines contains three things: the name, which expresses several things; the idea, which represents general things; and the nature, which is in several things.—(*La Dialectique du Sieur de Launay*, Dissert. iii. p. 72: Paris, 1673.)

(d) *Universale inest singulis inferiorum, et de illis potest prædicari, non secundum extensionem, seu universalitatem, sed secundum naturam tantum et comprehensionem. Ut tota essentia naturæ sensitivæ, secundum omnia attributa sua, est in singulis animalibus; non autem in tota extensione, quæ una cum convenientia eorum in quibus extendi-*

tur, est forma universalis.—(Goveanus, *Logica Elenctica*, Disp. x, p. 128 : Dublinii, 1683.)

There are explicit and intelligent notices of the distinction in Hutcheson, *Log. Comp*, pp. 24, 25 (ed. 1754) ; in William Duncan's *Elements of Logick*, I. iv. § 2 ; Kirwan, *Logick*, i. p. 41 (1807). With all this, the doctrine has remained comparatively unfruitful until our own day.

§ 408. The table of propositional forms given by Hamilton is defective, in so far as it does not specially provide a form for Singulars. The form which is the nearest approach to this is AfA, but this is not adequate, and does not mark out the Singular either properly or without ambiguity. The following scheme may be given as a complete and specific statement of Categorical Propositional forms:—

Affirmative—

I. *X is Y*. Singular Definite, Comprehensive only, in two forms.

(a) *Newton is the author of the Principia*. Concrete.

(b) *Veracity is the harmony between expression and conviction*. Abstract.

II. *All X is all Y*. Definite Omnitude—Double,—corresponding in Extension to Definite Singularity in Comprehension.

III. *All X is (some) Y*. Definite Omnitude—Single.

IV. *Some X is (all) Y*.

V. *Some X is (some) Y*.

Negative—

X is not Y.

I. *Newton is not the author of the Principia*.

II. *Any X is not (any) Y*.

III. *Any X is not (some) Y*.

IV. *Some X is not (any) Y*.

V. *Some X is not (some) Y*.

No. I. is in Comprehension alone ; No. II. is in Extension alone. All the others may be read both in Extension and in Comprehension. In the latter, the predicate is taken as indivisible and unquantified. If the predicate Y be taken as a class, we have an Extensive Proposition ; if it be taken as a mark or indivisible attribute, we have a Comprehensive Proposition, and that in both cases, whether Affirmative or Negative.

CHAPTER XXV.

QUANTIFIED PREDICATE—HISTORICAL NOTICES.

§ 409. The history of opinions regarding the legitimacy or the opposite of quantifying the predicate is one in itself of much interest, and it has acquired importance from its bearing on the logical theories of Hamilton, Thomson, and De Morgan, and other recent developments in formal logic. So far as Aristotle is concerned, the principle of quantifying the predicate was rejected by him, when he had the doctrine expressly before him.¹

On other occasions, Aristotle may be regarded as having proceeded on the legitimacy of the doctrine, and thus accepted it in practice. This is seen especially in his treatment of the formal Inductive Syllogism.² The great body of logicians, since the time of Aristotle, have been content to acquiesce in Aristotle's rejection of a quantified predicate, and generally for the reasons he has given, which are by no means cogent or satisfactory.³ The notices hitherto given of writers favourable to the doctrine of a Quantified Predicate, either in theory or in assumption in practice, are to be found mainly in Hamilton's *Logic*, and in Mr Baynes' *New Analytic of Logical Forms*.⁴ Neither Prantl nor Ueberweg has given adequate attention to this point in their historical references.

Mr Baynes, in the *New Analytic*, published in 1850, refers to certain names as recognising the doctrine in theory or in

¹ See *Categories*, ii. § 1, v. § 7. *De Int.*, c. vii. §§ 2-4 c. x. *An. Prior.*, i. c. xxvii. § 9. *An. Post.*, i. c. xu. § 10.

² See below, p. 449 *et seq.*

³ For a statement and criticism of Aristotle's views, see Hamilton, *Logic*, iv. Appendix g, p. 298 *et seq.*

⁴ *New Analytic*, App. i. p. 81.

practice. The first is Laurentius Valla (1408-1457), in his *De Dialectica, libri. iii.* The references are to the edition at Paris of 1530, though the work was probably first published much earlier.¹ Following Valla, is Ambrosius Nolanus in his *Castigationes adversus Averroem*: Venetiis, 1517. Then, Jodocus Isenacensis, or Jodoc Trutfeder of Eisenach, who was the instructor in philosophy of Luther,—by no means a sympathetic pupil,—and who died in 1519. His work is *Summulæ Totius Logicæ*, 1501. In England we have Joshua Oldfield, in his *Essay towards the Improvement of Reason*, 1707; and there is a reference to Godfrey Ploucquet, *Fundamenta Philosophiæ Speculativæ*, 1759. Thynne, in his notes to Walker's *Compendium of Logic*,—the Trinity College, Dublin, text-book of the time,—makes applications of the doctrine.

Hamilton refers to authorities for and against the principle,—among the former Titius, *Ars Cogitandi* (1721), and Ploucquet. His reference to Titius is, however, very incomplete.²

§ 410. Valla recognises the principle alike theoretically and practically, though he cannot be said to have carried it out with anything like scientific development or precision. He adduces a number of instances of express quantification in ordinary language, for his criticisms of the approved logical doctrines of his day were made chiefly from a grammatical standpoint. There is universality in the predicate in such expressions as these—*Nego aliquem esse beatum. Aliquem* is here equivalent to *ullum. Veto ullum intrare; prohibeo quemquam loqui.*³ Then he recognises the equivalence of subject and predicate in such expressions as *the lion roars* (*rugit*), *the horse neighs* (*hinnit*), *man laughs* (*ridet*). The predicate here is coextensive with the subject, and precisely convertible.⁴

Valla's doctrine acquires its importance from his application of it to the Conversion of Propositions. His doctrine on this point proceeds on the postulate of an express quantification of the predicate, and is perhaps the earliest application of it to this subject, affording at the same time a legitimate and useful simplification of the ordinary logical rules.

¹ There is a later edition—*Laurentii Vallæ Romani dialecticarum disputationum libri tres eruditiss. Opera Joannis Noviomagi castigati diligenter—Colonia, 1541.*

² See *Logic*, iv. Appendix g., and below, p. 334.

³ *De Dial.*, ii. c. xxix. See above, pp. 257, 310.

⁴ *De Dial.*, ii. xxii.

(a) "Although the signification of the predicate may be wider than that of the subject, yet it is not taken [in the proposition] as wider; and therefore subject and predicate are convertible—as *every man is animal*. This is not taken as the whole genus *animal*, but as some part of this genus; therefore *some part of animal is in every man*. In the same way, *some man is animal* means *some part of animal*; therefore *some part of animal is some man*. . . . In negation the principle is different, as *no man is a satyr*—that is, *no man is any satyr*, therefore, *no satyr is any man*. Collectively, *satyr is not a species of man*, that is, *any species of man, therefore any species of man is not a satyr*. . . . In negatives, *that or this fish is not fœtus-bringing forth, but ova-laying; to wit, of those which bring forth fœtus, but do not lay eggs, is not that or this fish*.

"*Thales is one of the seven wise men*—that is, *some one (aliquis) of the seven*—therefore *some one of the seven is Thales*. *Pythagoras was not of the seven wise men*—that is, *any of the seven*; therefore *any of the seven was not Pythagoras*." In arguing against the opinion that two sub-contraries are sometimes false together, when their predicates have a universal sign, as *Plato is every animal*, *Plato is not any animal*, Valla says: "These are not true sub-contraries, of which the second does not negate what the prior affirms. *Plato is every animal* has for its negative *Plato is not every animal*; and this negative has for affirmative, *Plato is some animal*, because we are not now able to say any."¹

§ 411. But the treatise which first most fully anticipated the main results of the doctrine of a Quantified Predicate, in respect not only to Conversion but the Moods and Figures of Syllogism, is one entirely unnoticed in the history of logical doctrine. It bears the following main title: *Habes studiosæ lector Magistri Lodovici Coronelli in sacra pagina doctoris eximii amplissimum non solum syllogismorum trium figurarum de medio communi tractatum; sed et syllogismorum expositoriorum in terminis divinis artem syllogisandi. Necnon conversiones simplicem et per accidens continentem. Omnemque ferme difficultatem dialectices enodantem Magistri Joannis Guidonis magna diligentia recognitum et emendatum. Veneunt Parrhisiis in via Jacobea in edibus honesti viri Bernardi Aubry. (1518).*

The sub-title is: *Syllogismorum tractatus a Magistro Ludovico Coronel Hispano artium professore editus auspiciato incipit.*

(a) Guido is the editor of the work or treatise, and he calls himself "Billarensis" in the preface to his pupils. He speaks of Coronel in the highest terms both as to character and learning.

Neither Ludovicus Coronel nor Guido is noticed by Prantl, while there is mention by him of Antonius Coronel, a prolific logical writer, who

¹ *Dialectica*, L. ii. c. 24.

taught in Paris in the early part of the sixteenth century, and who, like Ludovicus, was a native of Segovia. They were probably brothers. Antony dedicates his commentary on the *Later Analytics* to a brother, Franciscus Fernandus Coronel, a distinguished soldier, 1510. The treatise of Ludovicus Coronel, which is exceedingly rare, is in the spirit of Petrus Hispanus and the Terminalists. He and Antony had evidently come under the influence, at that time very powerful in Paris, of the Scot—John Major (1478-1540)—now almost only a name, but in his day and for more than a generation afterwards, one of the most influential of thinkers, and especially successful in creating a line of followers,—the last representatives of a retreating and modified scholasticism. Among these we can reckon Robert Caubraith, Scot; David Cranston, from Glasgow; William Manderston, Scot; George Lockhart, Scot; Caspar Lax and Johannes Dolz, both of Arragon, Johann Mayr or Eck, Antonius and Ludovicus Coronel, Joannes Dullaert of Ghent, and several others. The line of Major and his school was nominalistic, terminalistic in fact, which meant an attempt to render the scholastic logical abstractions more concrete by bringing them face to face with the forms of language, and thus nearer to actual human thinking. The line of Major,—the relations ultimately of Logic and Grammar,—requires still to be worked out.

§ 412. Ludovicus Coronel does not lay down explicitly or as a principle the doctrine of a quantified predicate, but he criticises the ordinary theory of Conversion, the general and special rules of Syllogism, even the distinctions of Mood and Figure, on a tacit assumption and application of this doctrine. And he proceeds, as will appear, on the principle which grounds the whole doctrine of express quantification, that we ought to distribute according to meaning, or enounce as we think. He is very cautious in dealing with the received rules, and the authority of Aristotle, which he tries constantly to claim; but he seeks, if not to substitute new rules for the old, at least to supplement them by others which he holds to be equally valid, and to yield “good and formal consequences.” In regard to Conversion, the author comes in the end to the view that all conversion is simple. Only let the same quantity remain in the process of conversion, and let us suppose the terms of the *conversa* and *convertens* in the same species of representation (*in eadem specie suppositionis*), and conversion is effected simply. Thus, by simple conversion, we can say, *All man is animal,—therefore, animal is all man. Man is Socrates,—therefore, Socrates is man—(fol. xxxb)*. This mode of it is to be applied to the imperfect moods. Conversion, moreover, is an inference,—

implying antecedent, consequent, and illation. To say *all man is animal*, therefore *all animal is man*,—is not conversion; because this is made from a *suppositio confusa*,—in modern language, from a lack of explicit quantification of the predicate. But we can convert simply all propositions by distributing according to the kinds of each (*distribuendo pro generibus singulorum*), as the sense may be. Thus even the universal affirmative proposition is converted simply, as *all man is all animal* is convertible into *all animal is all man*. About the Universal Negative there is no doubt. The Particular Negative thus admits of simple conversion,—as, *man is not animal*, therefore *animal is not man* (fol. xxxvib). Then he says, that every proposition is converted *per accidens*, by distributing according to the kinds of each, as Universal Negative and Universal Affirmative, and so may the Particular Negative, as, *Socrates is not an ass*, therefore *no ass is Socrates*; and *some man is not an ass*, therefore *every (any) ass is not some man*. The Particular Affirmative may also be thus converted,—*Some man is all animal*, therefore *all animal is man* (fol. xxxvib). We have here an express recognition of several of the new propositional forms in Hamilton's table,—viz., AfA, IfA, AfI, AnI, InA—and their simple convertibility.

If it be said, it is added, that these views are opposed to the common mode of speech, that two kinds of propositions are converted simply, and two *per accidens*,—the reply is, that the common method refers to propositions taken in the accustomed manner. Let the same quantity remain and let the logical proprieties be accepted in all respects in the same manner,—which is nothing else than that the terms in the *conversa* and *convertens* should stand in the same relation (kind) of representation (*suppositionis*),—then all conversion is simple (fol. xxxvib).

§ 413. In accordance with these views, a particular proposition is defined as that in which no term is distributed; a universal as that in which either term, subject or predicate, is distributed. He holds also that the rule regarding the invalidity of a conclusion from pure particulars does not apply to pure singulars, or the expository syllogism, which is “*argumentum efficacissimum*.” The rule against pure particulars refers to common terms. Further, if the antecedent

be formally impossible, or the consequent formally necessary, the consequence is good from pure particulars, or from pure negatives, as—(1) *Man is not man*; (2) *Man is or is not animal*; *Socrates is or is not running* (fol. v^b).

It is also held that there is consequence, which is non-syllogistic, and therefore not disposed in mood and figure. This does not depend on the premisses and the union of the extremes with the middle, but on the inference from the disjunctive part to the disjunctive whole (fol. ii^b).

(a) Coronei criticises the special rules of Syllogism, on the same principle.

The Second Rule, the major in the first figure, being particular, nothing follows; for as the middle term is the highest it is not distributed, and being the predicate in the minor (affirmative) it is not distributed. Against this you may argue, and well, these senses of the two rules of the First Figure are superfluous.

Other rules of the First Figure commonly assigned are: The middle ought to be the total predicate of the minor. But, on the other hand, it follows validly—

Every man (quilibet homo) is running,
Some ass is the ass of a man, therefore,
Some ass is the ass of one running.

Nor in a like form is an objection (*instantia*) capable of being given, yet the middle, which is the term *man*, is not total predicate of the minor, as is clear; therefore, it is said that that rule is not always to be observed. Secondly, the middle in the minor ought not to be accepted for others, nor for more than in the major. On the other hand it validly follows, *all man runs, all white was all man, all white runs*,—or thus, *all white was running*, yet the middle in the minor is taken for more (as well present and past) than in the major, in which it was precisely taken for the present. Therefore it is said that that rule is not absolutely to be observed.

The Third Rule *major de inesse et minore de præterito vel futuro aut possibili consequentia non valet*. On the contrary it validly follows, *all man is running, all white was all man, therefore all white was running*. Hence it is said that rule does not hold, and ought to be limited.

In the criticism of the moods of the different Figures, there is some well-founded argument, but also a good deal of verbal and irrelevant remark after the fashion of the subtleties of terminalism, and often grounded on a change of the terms themselves. In the First Figure, the following is held valid:—

All man is risible.
Some rational is all man (or ass.)

Therefore, *some rational is risible (or ass.)* This may be taken as equivalent to the mood AFI, IfA, IFI. The rule is,—that from a negative minor in the First Figure nothing follows, (1) because this would be arguing from the non-distributed to the distributed; (2) because the conclusion is unusual. Thus,

*All man is running,
No ass is man,
Therefore, no ass is running. But put it thus :—
All man is all running (AfA).
No ass is a man (AnA).*

Therefore, *no ass is running*, (AnA). “This is a good and formal consequence, but” (it is added, by way of *salvo*, to the received views) “it does not proceed against those instituting that rule, who were not using an affirmative proposition, whose predicate might be distributed. Also in thus inferring ;—therefore, *any* (quibet) *ass is not running*, although the predicate of the major be not distributed, it validly follows. Nor does this even proceed against them, because that mood is not used among them. But for all instances which can even be adduced, it is said that the sense of this rule,—the minor being negative in the first figure, nothing follows,—is that it is not inferred from the non-distributed to the distributed in respect of the major term ;—with this it stands that *Fapesmo* and *Prisesmorum* are good inferences, although the minor is negative.”

Again, with regard to the distribution of the middle term, there is, it is held, a good syllogism in *Barbara*, apart from perfect distribution of the middle, which is contrary to the common opinion. Let the minor term in the minor be completely distributed, and thus let the sense of the minor be *all which is man is animal* ; if, therefore, the distribution of the middle, according to the kinds of each, be sufficient to *Barbara*, it would be legitimate from those premisses to infer *all man is running*, the subject being completely distributed (fol. viii^a). The major here supposed is evidently *animal is running*.

Again :—

*Omnis homo est currens,
Risibile quilibet homo est,
Ergo, risibile est currens.*

This may be said not to be in *Darii*,—for it does not consist of a universal affirmative major, and a particular affirmative minor, for both premisses are universal. Of the first there can be no doubt. As to the second, one of the terms is distributed, and this is enough.

§ 414. Joannes Caramuel reduces all Conversion to Simple by explicit quantification of subject and predicate, and expressly recognises all the new propositional forms. He indicates the universality, particularity, singularity, and indefinitude of subject and predicate in a proposition by U, P, S, I. Thus, *All man is animal*, is U I. *All man is some animal*, is U P. *Some animal is all man*, is P U. *Some man is not some stone*, is P P. *Some man is not this stone*, is P S. *Some animal is this man*, is P S. The defect of his doctrine is that he does not perfectly distinguish between material and formal truth and falsity.¹

¹ See *Logica Vocalis, Opera*, p. 220: Francofurti, 1654.

§ 415. Titius, in his *Ars Cogitandi*, first published in 1701, very fully and explicitly anticipated the doctrine of the quantification of the Predicate; he recognises it not only in Propositions, but applies it to Conversion and Syllogism.

Titius holds that in universal affirmative propositions the predicate, for the most part particular, is sometimes attributed to the subject, according to its whole *comprehension*, but not according to its whole *extension*; while in negative propositions, although particular, the predicate for the most part being *universal*, is removed from the subject according both to its whole comprehension and its whole extension.¹

(a) Titius recognises universal affirmatives with universal predicate—as *Every man is (every) risible*, and a negative with particular predicate—as *no Turk is (some) man*—viz., *Christian*—or, *some doctor is not some man*.—(*Ars Cogitandi*, c. vi. §§ 44, 45.)

The error of the common doctrine of Conversion lies in the supposition that the predicate should assume the sign and quantity of the subject.—(*Ars Cogitandi*, c. vii. § 3 *et seq.* 1721.)

Titius holds conversion to be a simple transposition of subject and predicate, with the quantities of the convertend unchanged. Hence all conversion is simple and uniform. For example, (1) *No man is a stone*; no stone is a man. (2) *Some man is not medical (any)*; any medical is not some man. (3) *This Peter is not learned (any)*; any learned is not this Peter. (4) *Every man is animal (some)*; some animal is man. (5) *Some man runs (any)*; some runner is man. (6) *This Paul is learned (some)*; some learned is this Paul.—(*Ars Cogitandi*, c. vii. § 3 *et seq.*)²

§ 416. In 1827 appeared the work of George Bentham, *Outline of a New System of Logic*. In this we have a very close approach to the new Propositional Forms. Speaking of Propositions, he says:—

(a) “In the case where both terms of a proposition are collective entities, identity and diversity may have place:—

1. Between *any* individual referred to by one term, and *any* individual referred to by the other. Ex. The identity between equiangular and equilateral triangles.

2. Between *any* individual referred to by one term and *any one of a part* only of the individuals referred to by the other term. Ex. The identity between quadrupeds and swimming animals. Wherever a term is intended to be applied to *any* individual referred to by a common name, that term is called *universal*. Wherever it is intended to be applied to *any one of a part* only of such individuals, the term is called *partial*.

¹ *Ars Cogitandi*, c. vi. sections 37 *et seq.*

² See the editorial references in Hamilton, *Logic*, iv., *Appendices* V. (g), p. 298, VIII. A. p. 376, X. p. 442.

In affirmative propositions, *universality* is ascribed to the first term by prefixing to the common name the words *every* or *any*, to the second term by the word *any*; but, in the latter case, it seems necessary to express identity more distinctly than by the simple copula *is*; by some such expression as *is the same as*. In the same propositions, *partiality* is ascribed to the first term by the words *some* or *some one* (in Latin *aliquis*); to the last term by the same words when the first term is partial; by the word *a* when the first is universal. Ex.:

Every horse is a quadruped (partial).

Some quadrupeds (partial) are some flying animals (partial).

Every equiangular triangle (universal) is the same as any equilateral triangle (universal).

In negative propositions, universality is ascribed in the same manner, as also partiality to the first term; but in the case of the first term being universal, the negative sign (in the English language) must be combined with the sign of extent of the second, in order to avoid ambiguity. Ex. gr.:

Every horse (universal) is no cow (partial or universal).

Some quadrupeds (partial) are not flying animals (partial).

Every equiangular triangle (universal) is the same as no isosceles triangle (universal or partial).

Simple propositions, considered in regard to the above relations, may therefore be either affirmative or negative; and each term may be either universal or partial. These propositions are, therefore, reducible to the eight following forms, in which, in order to abstract every idea not connected with the substance of each species, I have expressed the two terms by the letters X and Y, their identity by the mathematical sign =, diversity by the sign ||, universality by the words *in toto*, and partiality by the words *ex parte*. These forms are:—

1. X in toto = Y ex parte.
2. X in toto || Y ex parte.
3. X in toto = Y in toto.
4. X in toto || Y in toto.
5. X ex parte = Y ex parte.
6. X ex parte || Y ex parte.
7. X ex parte = Y in toto.
8. X ex parte || Y in toto."

Bentham rejects *Some X is all Y*, *some X is not all Y*, as identical with *all X is some Y*, and *all X is not some Y*. He retains: (1) *All is all*; (2) *all is some*; (3) *all is not all or some*; (4) *some is some*; (5) *some is not some*. But beyond thus stating these propositional forms, he attempts no application of them in the science of Logic, except to say that the ordinary rules regarding distribution are not correct, and that for conversion, which he regards as a "conversive syllogism," the extent of the terms should always be distinctly expressed.—(*Outline of Logic*, chap. viii. p. 130 et seq.)

§ 417. As early as 1833, Hamilton had recognised the necessity for quantifying the predicate in affirmative propo-

sitions. This appears from the exposition of the Inductive Syllogism given by him in the contribution to the *Edinburgh Review* in April of that year. Therein is the principle assumed and applied. Before 1840, he had become convinced of the necessity of applying it to negative Propositions.¹

(a) Ueberweg remarks that the quantification of the predicate "has been carried out by Hamilton on the basis of assertions of Aristotle, and according to partial precedents in the *Logique ou l'art de Penser*, and in Beneke."—(*Logic*, p. 219.) The first portion of this statement is not exact; the whole only shows the small degree of attention which Ueberweg has given to the subject of the quantification of the predicate and its history.

¹ *Discussions*, Appendix II. A.

PART IV.

OF INFERENCE.

CHAPTER XXVI.

INFERENCE—IMMEDIATE AND MEDIATE—IMMEDIATE (1) TERMINAL EQUIPOLLENCE — (2) PROPOSITIONAL EQUIPOLLENCE — SUBALTERNATION—CONVERSION.

§ 418. The third product of the Faculty of the Understanding is Inference. This is of two kinds—Immediate and Mediate Inference, or Reasoning. The nature of each of those kinds of inference lies in what I would call necessary implication. As our basis we have a judgment, or judgments. As, in order to form the judgment, we advance from concepts or terms to their junction or disjunction; so, in inference, we advance from a judgment or series of judgments to another founded on that or those.

If we have but one judgment as a basis or ground, and if this yields another necessarily, as every judgment must, we have immediate inference. If we have two judgments so related that they necessitate a third, we have Mediate Inference, or what is known as Reasoning. As an example of the former, we may take what is popularly known as the Conversion of Propositions. Conversion arises when, retaining the same subject and predicate, we inferentially put the predicate in the place of the subject, and the

subject in the place of the predicate. Thus, if I say *no planet is inhabited*, I am entitled forthwith to say *anything inhabited is not a planet*. Or if I say *every X is Y*, I am entitled forthwith to say *some Y is every X*; or *if every X be included under (some) Y, then some Y includes every X*. Now these are cases of immediate inference, because I do not require to go beyond the terms, or data of the proposition given to be able, or even necessitated, to affirm the other or consequent proposition.

§ 419. Hamilton states the distinction between those two kinds of inference thus: "Reasoning [better Inference] is the showing out explicitly that a proposition not granted or supposed is implicitly contained in something granted or supposed. What is granted or supposed is either a single proposition or more than a single proposition." Immediate Inference arises when a second proposition is necessitated directly and without a medium by the first. In this species of inference there are only two notions and two propositions. In Mediate Inference, on the other hand, or Reasoning proper, there is the mediate eduction of one proposition out of the correlation of two others, and there are thus three collated notions.¹

§ 420. While it may be admitted that there is a difference between Immediate and Mediate Inference, it seems to me that it would be a mistake to suppose that those processes are regulated by different laws. They are simply forms, less or more complex, of the same process, and they are regulated by the same laws. The Law of Identity, for example, applies as readily—nay, more proximately—to immediate inference as to mediate, and is truly the ground of both. If I say *every A is B*, or *every covetous man is needy*, I can say with formal necessity *some A is B*; *some, or this covetous man, is needy*. Here I am really saying that if the whole is or is affirmed, the part is, or may be stated as being also. There is a direct application of the principle of containing and contained. There is no need of any third and mediating term or proposition in order to necessitate the conclusion, and this is truly all the difference between immediate and mediate inference. The law of inference or validity is the same in both cases. If I say *A is B*—that is, *a part of B*, but *C is a part of A*,

¹ *Discussions*, p. 651.

therefore, *C* is a part of *B*, I apply precisely the same law as in the former case; only here I directly apply it to a part of the whole (*A*), in order to make it clear that this part (*C*) is also a part of *B*. The explicit application of the law to a part of the inferior whole *A*, and through that to another part of the superior whole *B*, is merely an additional step in a process substantially identical with that of direct inference from whole to part.

§ 421. The cases of immediate inference are varied; and to this head may be reduced many logical processes which have not been considered as inferences at all, but which are truly such. It is necessary to show that these are reducible to a single head or principle, in the interest of a scientific logic. The practical use of their consideration is to bring out clearly what lurks in everyday statements, often without consciousness of it on the part of those making them.

§ 422. Immediate Inference may be divided into Terminal and Propositional. The main form of Immediate Terminal Inference is Equipollence. Equipollence is the complete agreement in meaning of two propositions which are enounced in different forms of expression, so that, given the one form of expression, we may translate this strictly into the other. This is obviously not so much a case of immediate inference—that is, inference grounded on the thought—as a case of recognised equivalence between two different forms of expression for the same concept, degree of quantity, or proposition. It may thus be described as immediate terminal inference or equivalence, and properly belongs to the domain of Grammar. Here the postulate of logic imperatively applies: State in a definite form of language what you definitely think as to meaning, quantity, and quality. The consideration of the Equipollentia of propositions has occupied a large space in Logic, especially since the time of William of Shyrewood and the date of the *Summulæ* of Petrus Hispanus. But the whole discussion, while of grammatical and general import, is strictly extra-logical, and only requires a passing reference.

(a) "Equipollence is that by which two or more enunciations, a negation mediating, are reduced to the same value of quantity and quality."—(Stier, *Præcepta Doctrinæ*, Tract. ii. p. 17. 1659.)

§ 423. Equipollence in propositions arose very much from

the use of the negative particle in Latin, before signs of universality, and also before signs of negation. Thus, when we say *non omnis* (*not every one*), we mean *some are not*. *Omnis non*, *every one not*, means *nullus*, *not any one*. *Non nullus*, *not none*, means *quidam*, *some*. *Nullus non*, *none not*, means *every one*; and so on. Thus, *non omne peccatum est crimen*, *not every sin is a crime—that is, some is not*. If we had said *omne peccatum non est crimen*, we should mean *no sin is a crime*, which is a very different proposition. Hamilton recognises Equipollence as a form of Immediate Inference; but he restricts it considerably, and identifies it mainly with Double Negation. Thus, *A is not not-A*. This is merely translating an affirmation into a double negation, and is, as he remarks, of merely grammatical import.¹

(α) The forms of Equipollence have been expressed by the Latin logicians in mnemonic lines. Shyrewood, probably the oldest (died after 1249), gives:—

“Equivalent omnis, nullus non, non aliquis non;
Nullus, non aliquis, omnis non, æquiparantur;
Quidam, non nullus, non omnis non, sociantur;
Quidam non, non nullus non, non omnis, adherent.

Or all together:—

Præ Contradic, Post Contrar, Præ Postque Subalter.”
(See also Lambert of Auxerre, quoted in Prantl, iii. 28.)

Non omnis, quidam non. Omnis non quasi nullus.

Non nullus, quidam; sed nullus non valet omnis.

Non alter, neuter. Neuter non præstat uterque.

(b) (1.) Sign of negation prefixed to a universal or particular sign implies the contradictory.

(2.) Sign of negation placed after a universal sign implies the contrary.

(3.) Sign of negation placed before and after a universal or particular sign implies the subaltern.

Hence, (4.) when two universal negative signs are placed in the same expression, one in the subject and another in the predicate, then the first is equipollent to its contrary by the second rule, and the second to its contradictory by the first rule.—(Hispanus, *Summul.*, i. 3, 2, f. 36 A. Prantl, iv. 44.)

The forms of expression and rules have been repeated by logicians with very slight variations since the time of Hispanus. On the authorship of these and other mnemonic lines, see below, p. 399.

§ 424. (1.) The first and simplest form of Immediate Propositional Inference is that of Subalternation or Restriction, usually placed under Conversion. This arises when we infer *some* from *all*, or restrict the quantity either of the subject or

¹ *Logic*, iv. p. 269.

predicate, or both. Thus *all X is Y*, therefore *some X is Y*. *Some X is all Y*, therefore *some X is some Y*. *All X is all Y*, therefore *some X is some Y*. Here *some* means *some at least*.¹ This obviously proceeds on the Law of Identity of whole and part. Subalternation is commonly regarded as a form of opposition. It is really not so. There is no opposition between *all* or the *whole* of a class, and *some* of the same, provided *some* be taken as meaning *some at least*. If *some* be taken as meaning *some only*, there is not only opposition, but contradiction. *All men are civilised*, and *some only are civilised*, are opposed as negatives and contradictories.

§ 425. (2.) Conversion is commonly spoken of as a transposition of terms—that is, of subject and predicate. It is this; but it is so only through the necessity of inference or consequence. It is because from the original form of the proposition or convertend we can infer the same proposition or an equivalent in a new form, that conversion is possible. No conversion is true or real which is not strictly inferential, or dependent on a necessity of consequence. There is and can be no change, as is supposed, in the quantity of the terms,—no change from universal to particular in legitimate conversion. The warrant of the inference is in the original proposition, and in that alone; hence conversion is inference, and properly immediate inference.

§ 426. Conversion arises only when the *convertens*, better *conversa*, follows necessarily from the given proposition or *convertend*. It is, in fact, a process from equal to equal. But this necessity can never be accurately ascertained until the terms of the proposition are definitely—that is, in the case of Extension, quantitatively given. All conversion in extension supposes explicit quantification alike of subject and predicate; it is only thus that conversion is logically or scientifically possible, and that we can avoid the mistake of supposing a change or accommodation of terms different from the original, and in the interest of artificial processes and rules.

§ 427. The canon of Conversive Inference may be thus stated: The predicate of a proposition, in so far as it is affirmed or denied of the subject, may become subject to the original or given subject, now predicate. Thus *All X is some Y*; hence *some Y is all X*. *No X is any Y*; therefore *no Y is any X*.

¹ Cf. Hamilton, *Logic*, App. p. 269.

(a) Conversion proceeds on the necessity of the consequence, through this, that the predicate is said of the subject. In this Conversion differs from Syllogism and Enthymeme. Because it is necessary, it differs from the conversion of a particular negative, for although that may be transposition of subject and predicate, it is not conversion, because it is not a formal consequence. Whence it follows that conversion is a hypothetical, conditional, or rational proposition, whose antecedent is called the Converse (*conversa*), the consequent the Converting (*convertens*); and therefore the proposition given to be converted (*convertenda*) is the converse, and the other through which it is converted the converting (*convertens*)—(Duns Scotus, *In Universam Aristotelis Logicam Exactissima Questiones. In An. Pr., i. quæst. xii.*)

§ 428. According to the ordinary logical doctrine, we have three kinds of Conversion. (1.) Simple Conversion is that in which are preserved, in the converse, the quality $\gamma.\eta\eta\delta$ quantity of the original proposition. Universal negatives and particular affirmatives are thus convertible. Thus, *no (not any) X is Y*; therefore, *no (not any) Y is X*. *No horse is a biped*; hence, *no biped is a horse*. *Some men are tall*; therefore, *some tall things are men*. *Some animals are short-lived*; therefore, *some short-lived are animals*. *Some X is Y*; therefore, *some Y is X*.

§ 429. (2.) *Conversio per accidens*, or $\kappa\alpha\tau\alpha\ \mu\acute{\epsilon}\rho\omicron\varsigma$, is that in which the quality is preserved, but the quantity is diminished. The universal, in a word, is converted into the particular of the same quality. All universal affirmatives are thus convertible—as, *every man is animal*; therefore, *some animal is man*. *Every A is B*; therefore, *some B is A*. It is further held generally that where a universal affirmative is convertible into a universal affirmative, or rather an affirmative proposition with a universal subject, this takes place, not by reason of the form, but of the matter—as, *every man is capable of philosophy*; hence, *every one capable of philosophy is a man*; otherwise, we might infer from *every man is an animal*, that *every animal is a man*.¹ This represents the common view of logicians on the point.

§ 430. (3.) Conversion *per contrapositionem* is simply through contradiction and then transposition of subject and predicate. In place of the subject of the proposition, we have the contradictory of the predicate laid down; and in place of the predicate, the contradictory of the subject. Thus, *every man*

¹ Cf. Mark Duncanson, *Inst. Log.*, ii. 4.

is capable of being a grammarian ; hence, he who is not capable of being a grammarian is not a man. Every *A* is *B* ; therefore, everything that is not *B* is not *A*. Aristotle recognised this form of conversion, and called it indirect consecution in contradictories.¹ This is a form of Equipollence.

(a) FEeI simpliciter convertitur, EvA per accid,
AstO per contra, sic fit conversio tota.

—(Petrus Hispanus, *Summ.*, i. 24, p. 30 B. Prantl, iv. 43.)

§ 431. The rules for these processes in the ordinary logical system are cumbrous, and, in several respects, inadequate. They do not always accomplish what they profess, and they often assume* other hidden processes which are necessary to their working.

§ 432. Conversion *per accidens* is applied to *A* and *E*. But in neither case is the process a scientific one. To take *A*, as has been pointed out, conversion *per accidens* is not a conversion of *A*, but of the particular included in *A*. Thus : *all X is Y*, is converted into *some Y is X*. But *some Y is X* is the direct converse of *some X is Y*, and only indirectly of *all X is Y*, because *all X* includes *some X*. This is not properly conversion, but Immediate Inference of Subalternation, because *all is*, *some is*.

The conversion of *O*, *some X is not Y*, is done by Contraposition—attaching the *not* to the predicate. This is rather evading conversion than accomplishing it. There is a change of terms. Neither Conversion by Limitation nor by Contraposition is a self-sufficient process. There is always in each another process implied, but not unfolded.²

§ 433. According to Hamilton, the first great source of error in the ordinary doctrine of Conversion is that the quantities are not converted with the quantified terms. Logicians have looked at the naked terms of the proposition ; whereas the terms with which they ought to have dealt, are the terms as quantified in the original proposition. When we say *all plant is organised*, we ought not to consider merely *plant* and *organised* in the conversion, but the quantity of each term as well. The moment we do this, the so-called limitation of *all* to *some* disappears ; for it was *all* and *some* to begin with, and we can say by Simple Conversion *some organised is all plant*. The quantity of the proposition in Conver-

¹ *Top.*, ii. 8.

² *Logic*, App. v. (c) p. 275.

sion is thus shown to remain always the same. That of the Converse is exactly equal to that of the convertend or original proposition. Logicians, looking only to the quantity of the subject, and not considering that the predicate has always a quantity in thought as well, called the one proposition universal, and the other particular, whereas in quantity they were precisely equivalent—*All X is (some) Y* is precisely equivalent to *Some Y is all X*. It is not maintained that this express quantification of the predicate is always necessary in ordinary thought and language. It is sufficient if the predicate be as extensive as the subject, which every affirmative judgment must assume. Whether it be in itself more extensive is generally of little moment. But as soon as we have to find its immediate implicate by Conversion, we must determine the quantity of the predicate which subsists in thought to be explicitly stated. This being done, all Conversion of Propositions becomes one—simple, natural, and thorough-going. There can be no doubt that Hamilton has for the first time clearly shown the true character of Conversion, its requisite, and its rule. Wherever thought needs to seek the converse of a proposition, its best, easiest, and most scientific way is to conform to the simple principle which Hamilton has given.

§ 434 The table of Hamilton, with the Eight Propositional Forms, shows at a glance the convertibility of each :

- AfA, All X is all Y = AfA.
 (A) AfI, All X is some Y = IfA.
 IfA, Some X is all Y = AfI.
 (I) IfI, Some X is some Y = IfI.
 (E) AnA, Any X is not any Y = AnA.
 AnI, Any X is not some Y = InA.
 (O) InA, Some X is not any Y = A n I.
 InI, Some X is not some Y = InI.

(a) The attempts at modifying the current doctrine of conversion by the older logicians are curious and suggestive.

Universal Negative is twofold,—(1) in which the predicate is distributed, as *no man is an ass*. (2) in which the predicate is not distributed, as when the predicate precedes the negation, as *omnis homo animal non est* (*every man is not animal*.)

In the first case, the conversion is simple, as every *suppositum* in the subject is removed from it in the predicate, so every *suppositum* in the predicate is removed from it in the subject.

In the second case, there cannot be simple conversion, as *every phoenix is not animal* (*omnis phoenix animal non est*), therefore, *some animal is not phoenix*. This *per accidens*.—(Duns Scotus, *In An. Pr.*, L. i. c. xii.)

The particular affirmative proposition is of two sorts, (1) with the predicate discrete, as *some man is Socrates*. This cannot be converted simply, but only *per accidens* into one singular, *Socrates is a man*. But, with addition, this can be converted simply, as *aliquid quod est Socrates est homo*. Such a particular implies a universal from the terms transposed, as *some man is Socrates*; therefore, *all which is Socrates is man*.

This does not hold in divine things, as, *this essence is the father*, therefore, *everything which is this divine essence is the father*. The son is this divine essence, and he is not the father. This consequence is, therefore, not formal.—(Duns Scotus, *In An. Pr.*, L. i. c. xiii.)

Scotus recognises a particular affirmative proposition with a distributed predicate, as *some moon is every moon* (*quidam luna est omnis luna*). This can be simply converted, *every moon is (the) moon*. Here the predicate stands for every one of its *supposita*; the subject for one *suppositum*, and these are equivalent.—(*Ibid.*)

(b) *Æqualis vero est subjectus terminus prædicato, ut si quis dicat "homo risibilis est"; ut vero id quod subjectum est majus possit esse prædicato, nulla prorsus enuntiatione contingit, ipsa enim prædicata natura minora esse non patitur*.—(Boethius, *Introd. ad Syll. Cat.*, p. 562. Prantl, i. p. 696.)

(c) Mark Duncan argues against simple conversion of Particular Negative thus: *Some man is not stone*; e converso, *some stone is not man*. This is not formally good. For, by parity of conversion, if *some animal is not man*, *some man is not animal*; therefore *some stone is not man*, not because *some man is not stone*, but because *no man is stone*.—(*Inst. Log.*, L. ii. c. v. § 5.)

(d) The particular affirmative is not converted *per contrapositionem*—*Something intelligent is man*; *something not man is not intelligent*.—(Shyrewood. Prantl, iii. 15.)

On Conversion, see especially Marsilius von Inghen.—(Prantl, iv. 97.)

§ 435. Some logicians, among others Thomson, regard the following as cases of Immediate Negative Conceptions. A statement made in a positive predicate regarding a subject inference, implies a statement regarding its opposite, or contradictory. *The bodily organism is material*; this implies that it is *not immaterial*. *All human virtues are not without alloy or imperfection*. This implies that *all human virtues are short of their type*, and that *a perfect act of virtue is not within the power of man*. These are virtually the same statements, but they are made from different points of view, and they may be supposed to bring out what is implied in the original statements. It is clear, however, that, unless in the case of the simple contradictory, there is here no purely formal inference.

It is either a case of the same predicate in other words ; or of a predicate implied through a medium or process of reasoning. All *actual* human virtues may be imperfect, without the consequence that all *possible* virtues of man are so. There is no immediate connection between those two statements. This so-called form of immediate inference, in so far as it is non-contradictory, comes properly under the head of Equipollence, —being purely terminal.

§ 436. Immediate Inference through Determination.—Determination means adding a predicate or term to a notion, so as to make it more specific or determinate. We determine every time we proceed from higher genera to lower species. Thus, *an animal is like ourselves a sentient creature ; therefore, an animal struck or wounded is a creature in suffering like ourselves.* There is here no purely formal immediate inference ; the connection between a sentient creature, struck or wounded and suffering, is known through induction, and is here inferred through a major. *Sentiency, wounded, suffering,* are after observation associated or connected, but the concept of the one does not necessarily lead in any way to that of the other.

§ 437. Immediate Inference by Complex Conceptions.—This arises when the subject and predicate, that is, the entire proposition, is added comprehensively to the original conception. Thus, *the molecule of sand consists of silicon and oxygen ; therefore, the analysis of the molecule of sand into those elements would be an analysis of a molecule.* Not, certainly, of a molecule, meaning *any* molecule, but simply of the molecule of sand. But to call this an inference, immediate or other, is a simple misnomer. It is a mere tautology. The doctrine of *Exponibles*, with the old logicians, and the propositional implicates unfolded according to their rules, were much better grounded than this.

CHAPTER XXVII.

IMMEDIATE INFERENCE—OPPOSITION—CONTRARY AND
CONTRADICTORY.

§ 438. "Since it may happen that what is may be enunciated as if it were not, and what is not as if it were, and what is as if it were, and what is not as if it were not; further, as this applies equally to the present and to other times, therefore it is lawful to deny all those things which any one has affirmed, as well as to affirm those things which any one has denied. Whence it appears that to every affirmation is opposed a negation, to every negation an affirmation; let this be contradiction (*ἀντίφασις*), the affirmation and negation of the opposite. But I call opposed that which is of the same concerning the same, not the species alone of one expression."¹

§ 439. Aristotle here raises a very important and fundamental question. We seek frequently to deny or contradict, to state the opposite of a given proposition. The question arises, How can we best do so? In other words, how are we to make a statement which shall deny a given statement or proposition without doing more than exactly denying it—that is, without doing more than is logically required of us? Out of this need or question arises what is called the doctrine of the Opposition of Propositions. And this is one of the most important and also one of the nicest points in Logic. It depends essentially on the negation or negative proposition which is strictly implied in any advanced or given proposition. The proposition we advance may be an affirmative. In this case, what we have to look for is the negative which

¹ *De Int.*, c. 6.

will precisely deny it, and do nothing more. The proposition advanced may be a negative. In this case, what we have to look for is the affirmative which will directly confront and conflict with it, and which, if established, will render it untenable. These propositions will be regarded as opposites of various kinds, and the test of them in each case will be the strictness of the Immediate Inference with which, as negatives or affirmatives, they are implied in and follow from the original proposition. He who makes a statement is bound to accept all that which it logically implies, and only that which it logically implies,—in affirmation, therefore, to exclude the immediately involved negation; in negation to exclude the immediately conflictive affirmation.

§ 440. In dealing with this point, it may be well to ~~sketch~~ generally, before proceeding to detail, the main forms and features of the Opposition of propositions. This will be found to admit of degrees. Let us take, first, universal affirmative and universal negative propositions. If it is said that *every X is Y*, I can deny this by saying that *no X is Y*. Or, to take a concrete example,—if it is said that *every planet is inhabited*, this may be denied by saying that *no planet is inhabited*. Now, look at these two propositions. The one, *every planet is inhabited*, is a universal affirmative; the other, *no planet is inhabited*, is a universal negative. They agree in quantity, but they differ in quality. They are both universals: they speak of the whole of the subject; but the one is affirmative, and the other negative. The opposition, therefore, here is tolerably complete; for the one affirms universally of the subject, or affirms of the whole subject; the other denies universally of the subject, or of the whole subject. Yet this is not the highest or the extreme form of opposition. For while the assertion or the truth of the one proposition implies the denial or the falsity of the other, the denial or the falsity of the one does not imply the affirmation or the truth of the other. Thus it cannot possibly be asserted or be true that *every planet is inhabited*, and that *no planet is inhabited*; that *every X is Y*, and that *no X is Y*. If the former of these statements be true, the latter is false. But the denial of the former statement does not imply the truth of the latter. It may be false that *every planet is inhabited*, yet it does not follow that *all planets are not inhabited*; for if even *one planet*,

or some planets were not inhabited, it would be false that *every* one is. All, therefore, which I have to prove or assert in order to deny that *every X is Y*, is not that *every X is not Y*, but only that *some X is not Y*. And if I did not see this in an argument, and did not keep by it, I should simply be giving up my fair logical position and advantage. This kind of opposition between Propositions is what is called Contrary Opposition, or the Opposition of Contraries. It holds only between A and E.

§ 441. But there is still another and a stronger degree of opposition between propositions than this. This degree consists in such a contrast or opposition, that if the one proposition be true, the other is necessarily false; or if the one proposition be false, the other is necessarily true. Or, to put it in logical language, if the one proposition be affirmed, its opposite must be denied; or if the one proposition be denied, the other must necessarily be affirmed. This mutual relation holds only when the opposing propositions differ alike in quantity and in quality. Thus, we may say,—(A) *every planet is inhabited*, and in opposition we may say, (O) *some planets are not inhabited*. If it be true that *every planet is inhabited*, it is false that *some are not*. If it be false that *every planet is inhabited*, then it is at least true that *some are not*. In other words, the truth of the one proposition implies the falsity of the other; and the falsity of the one implies the truth of the other. So it is also with E and I—universal negative and particular affirmative. This form of opposition is called Contradictory Opposition; it is the strongest or the extreme form known to human thought. It is absolutely insuperable. No compromise, no conciliation is possible between those two forms of statement,—of affirmation and negation,—of *yes* and *no*. Between Contrary Propositions there is a possible medium or middle position; we do not necessarily pass from the one to the other,—from *all* to *none*,—we may rest in *some*. But in the case of contradictory opposition, there is no such medium or resting-place possible. Between saying that *every one is*, and that *some are not*,—we cannot find a compromise or resting-place for thought. These statements are absolutely exclusive of each other. Hence it is laid down as an imperative logical rule—that is, a supreme law of human thinking—that there is no medium or middle

between contradictory propositions. This is called the law of Excluded Middle between Contradictories. Contradictory opposition holds between A and O, and E and I.

§ 442. It is right to say that these two kinds of *opposition*—*Contrary* and *Contradictory*—hold in relation not only to Propositions but to Terms or Notions. Thus, *e.g.*, *black* and *white* are contrary terms, for an object cannot be both at once; and there may be objects that are neither the one nor the other. A *stone* cannot be both; but a *feeling*, or a *desire*, or a *volition* cannot be either the one or the other.

Again, *organised* and *non-organised* cannot be applied to the same thing in one act of conception or judgment; and there is nothing, in extreme logical exactness, of which we can think, which does not fall under the one head or the other. So that these notions exhaust the whole sphere of the thinkable.

Being and *non-being*, for example, are absolute contradictories, to those who understand the meaning of the terms. There is no possibility of conciliating these by a medium or middle notion. Nothing can at once *be* and *not-be*; to say that these are the same because the term *being* occurs in the second half of the thought, is arbitrarily to leave out the difference expressed by *not*, and thus say that there is a unity when you have merely abolished the real difference—*i.e.*, changed the terms. This application, however, of negation to concepts seems to me to be a secondary one, grounded on the negation properly expressed in the judgment, and transferred for the sake of brevity and grammatical purposes to language.

(a) That the same, in the same reference, at the same time, should belong and not belong to the same thing is impossible. This is the most certain of all principles; for it is impossible that any one can conceive as the same being and not-being. Wherefore, all recall demonstration to this ultimate belief.—(*Met.*, iv. 3.) Aristotle says—*τὸ αὐτὸ ἅμα καὶ κατὰ τὸ αὐτὸ*, because affirmation and negation of the same thing or the one after the other, or the one in respect of the other, there may be. If the same, at the same time, and in the same thing, could both be and not be, and in reason be affirmed and denied, all things would be mixed, and nothing stable. There would be no species which you could define as universal; there would be no necessity, nothing of which the nature is not to be both one way and another. To pursue truth would be to follow the flying (*τὰ πετόμενα διώκειν*); but it is the nature of intelligence to intelligise unity. The sublation of this principle, that is, non-contradiction, is the abolition of cognition and of reality.—(Cf. *Met.* iv. 3-7, xl. 5, and Trendelenburg, *El. Log.* § 9.)

§ 443. There is a good deal of misconception prevalent regarding the true character and import of Contradictory and Contrary Opposition, whether as regards propositions or concepts. People talk in a vague and inaccurate manner about these two kinds of opposition, and continually confound them. But the truth is that Contradictory Opposition means an absolute or irreconcilable opposition, while Contrary Opposition does not. If a beggar asks me for a halfpenny, and I say *no*, or I shall give you *none*, I should be properly understood to say absolutely *none*, not even one halfpenny. If I gave him a halfpenny, he would have something—what is positive; if I gave him no halfpenny, he would have nothing—what is negative. This seems tolerably clear, but we are told that Contradictory Opposites are equally positive, or real; that halfpenny and no-halfpenny, or penny and no-penny, are equally positive in thought and in reality. I am perfectly certain that the beggar does not think so. The assumption underlying this view must be, that we cannot negate except by putting something positive on the other side. We cannot say *no halfpenny* without implying a farthing, or a penny, or a sixpence, or something of that sort. Now I venture to think this a total misconception of the nature of negation. We may deny, and deny absolutely, without supposing or implying a positive at all. We do so in every case of Contradictory Negation. The apparent exceptions are really cases of an inferior kind of opposition—Contrary Opposition. *E.g.*, to take number. We say *one* and *two* are opposites. When we deny or negate *one*, when we say there is not one, we may of course be supposed to mean there is more than one—there are two. We here, however, first of all suppose that the thing we speak of is and may of course be numbered. We regard it as coming under a class, and as belonging to some portion of that class—viz., number—either one, two, three, or four, &c. But *two* or *three* is not the true contradictory of *one*. This is *none—not even one—not any*; and in the denial here we lay down nothing, we simply sweep absolutely away. That is true contradictory denial; and here there is no possible alternative, and no positive notion laid down in opposition. The importance of this distinction is seen the moment you come to deal with a philosophy which

professes to construct all thought and reality by the law of contradiction, which alleges that the contradictory actually passes into its opposite, and so passing forms knowledge and reality. Nothing can be more futile, and even meaningless, than such a pretension. When we abolish or supersede the law of contradiction, we abolish all knowledge, we reduce everything to chaos.

§ 444. True logical opposition, whether contrary or contradictory, is an opposition of quality in concepts, and as such it is independent of time. But when we apply opposition to experience, the element of time necessarily comes into consideration. A subject of a judgment may be quite capable of contraries in successive times—as *a body at rest and in motion*. And so of contradictories even,—for *what lives may pass into what does not live; what feels into what does not feel*. This, however, in no way affects the laws regulating what is ideally contrary or contradictory. It only modifies their application. It makes not the slightest difference in the concepts of the qualities as different, or even in the fact of their difference as a matter of experience.

§ 445. Opposition in propositions, as founded on opposition in qualities of things, and in their concepts, is of those qualities or concepts which differ the most in the same genus. In *colour* we have the various forms of colour, such as *black and white*; in the sensible sphere we have *pleasure and pain, heat and cold, light and darkness, motion and rest, &c.*; in the moral sphere, *good and evil, avarice, prodigality*; in the intellectual sphere, *belief, doubt, unbelief*. In other words, Contraries are positive concepts which exclude each other from a subject capable of them.¹

§ 446. The older logicians recognised different grounds in the opposition of judgments. Some they regarded as opposed materially, others formally. In this, indeed, they followed Aristotle.² The chief principle of difference is, that material opposites admit of a medium, while formal opposites do not. The application of this principle is not always quite clear; but probably concepts under a genus, as *red, green, yellow, rich and poor, &c.*, might be regarded as materially opposed, seeing that any one of these affirmed and denied as a predi-

¹ Cf. *Cat.* vi., *Met.* vi. 10.

² See *De Int.*, vi., *De Soph. Elench.*, v., *An. Pr.*, ii. 35.

cate would admit of a medium. The object might be neither one nor other of two, yet something else under the genus. In formal opposition, affirmation and mere negation—*is*, or *is-not*—there is no medium, as *rich* and *not rich*. The same is affirmed and denied of the same in name and thing. In modern language we should say that the former kind of opposition depends on difference of intuition, this being ultimately referable to the constitution of the outer and inner faculties of observation and reflection; while the latter depends on the simple application of the formula of non-contradiction.

But the truth is, that all opposition depends for its force ultimately on Contradiction. The first in every genus, as Aristotle remarks, is the measure of the rest. Contradiction is the first, simplest, and truest form of opposition. Contradiction is, therefore, the measure of all opposition. *White* is opposed to *black* through intuition, but the intuition is founded on the implied difference or contradiction of *white* and *not-white*. *The world is either eternal, or the work of chance, or the work of intelligence*. This division is primarily through the contradictory—*The world is either eternal or non-eternal*—that is, *it had a beginning in chance or in intelligence*.¹

§ 447. Now the question arises as to the possibility of a middle or uniting term. In the case of Contraries, as they belong to the same genus, they may be conceived as each a species of the genus—*e.g.*, *white* and *black* is each a species of colour, as *pleasure* and *pain* is each a species of sensation. In the case of Contradictories, affirmation and negation of one and the same attribute may be regarded as included under Consciousness. But this is the genus of the acts of mind; it is not the genus, properly speaking, of the attribute affirmed and denied, as sensation is the genus of pleasure and pain. The attribute and its contradictory negation do not come under the same genus. The attribute and its contrary negation do so. This genus may be said to unite in a sense the two contraries; but the position and the negation of the same attribute cannot be so united.

§ 448. It follows from this that, while in Contrary opposition the mutual exclusion of the attributes is through two positive attributes, the mutual exclusion of the attributes in

¹ Cf. Aristotle, *Met.*, x., and Duncan, *Inst. Log.*, i. 13.

Contradictory opposition is not necessarily through two positive attributes, but through a positive attribute and its bare negation—the mere absence of it. Hence, when I negate contradictorily, I do not necessarily posit another attribute in the place of the negated attribute; I only absolutely take it away. I negate, *e.g.*, contradictorily *sensation*. I say this subject is *insentient*, or it is incapable of *vision*. Here I put nothing in the place of the sensation or the vision negated; I merely leave the subject of which I speak to be referred to any one in the sphere of possible predicates—the only limit to this being that the predicate is compatible with the nature of the subject, whatever that may be. The negation affirms nothing beyond the indefinite possibility of some other competent predicate.

In the case of Contraries, affirmation and negation differ. Here I am dealing with a class of things already constituted. I am dealing with opposites or the greatest opposites in that class. I affirm one of them; I necessarily deny the other. I say this figure is a *square*, it is not a *circle*; this sensation is *pleasurable*, it is not *painful*. Here I select, as it were, among the members of a constituted genus. But what of negation? Suppose I say of the sensation, it is not *painful*, or of an object of vision, it is not *green*. Do these necessarily put anything in the place of the attribute negated? I have made the object I speak of more determinate, in the sense of having excluded it from a particular predicate in the class to which it belongs. But that is all. The sensation may be either *pleasurable* or *indifferent*. The object seen is some other colour. But I do not by this act say definitely what other colour it is. It is not *green*; it may be *red*, or *blue*, or *white*—since it must be one or other. That I know independently. But all that my negation of the particular attribute implies is that some predicate of colour may be attributed to it; beyond this indefinite possibility nothing is implied.

§ 449. Accordingly, while it is true that every determination is a negation, the contrary is not true that every negation is a determination. A negation is a determination only in the sense of excluding from a particular attribute, and leaving the subject to be referred to some other class, or to be clothed in some other attribute not specified. The negation itself does not fix anything,—does not really determine,—unless where

we have already restricted the sphere of predication to two possibilities, which supposes the principle of Non-Contradiction. If the possible predicates be more, we know only that the subject is in one or other—a case, in fact, of contrary disjunction. And contrariety itself, as restricted to the species under a class, supposes also the principle of Non-Contradiction; for this class must first of all by it be discriminated from other classes.

§ 450. As to a medium between two Contradictories, the very conception of its possibility is precluded. Affirmation and negation of the same attribute in respect of the same subject are not only impossible; they are irreconcilable by any third notion, for the reason either that the subject of the predication itself has been sublated, as *A is, A is not*, or that the attribute and its contradictory opposite abolish the attribute itself, as *organised and non-organised*.

“In all attributions,” says Aristotle, “where there is no contradiction, although even the definitions are substituted for names, and where the attributes are in the subject by themselves and not by accident, we can always, without deceiving ourselves, apply absolutely the isolated attributes to the thing. Nevertheless, non-being, simply because it is rational, cannot with truth be expressed as being; for the thought which we form of it is not that it is, but on the contrary, that it is not.”¹

§ 451. Opposites are thus, according to Aristotle, of two kinds, Immediate and Mediate.

The Immediate Contraries (*i.e.*, Contradictories) are such that one of them must necessarily be in those things in which it can naturally be, or of which it is predicated. These have nothing intermediate. Thus, *number* must be *odd* or *even*. Here there is nothing intermediate—no middle.

§ 452. Mediate Contraries, on the other hand, have something intermediate, in which one of them need not be inherent. Thus, *black* and *white* are both predicable of body, yet it need not be either. *Beauty* and *strength* are predicable of man, but he need not possess either. The intermediate is sometimes named, as *dark brown, pale*, with regard to *black* and *white*. The intermediate again is sometimes the negation of both extremes, as what is *neither good nor bad, just nor unjust*.

¹ *De Int.*, c. xi. § 11.

§ 453. Out of this hint of a discrimination of *media* in Contraries, logicians following Aristotle explicitly developed the distinction between the *media forma* and the *medium subiectum*. The *middle form* in contrary opposition is found when of the extremes in their nature predicable of an object it is yet neither, but, it may be, a third of the same class, as *red* is a middle form between *white* and *black*; and *body* may be neither of the two latter, but the first mentioned. This is called the middle from participation of the extremes.

The *middle subject* is found when of two contrary predicates neither is applicable to the subject, as *black* and *white*, neither of which is applicable to *soul*; or *blind* and *seeing*, neither of which is applicable to *stone*. The middle subject is so called from a negation of the extremes. The middle form was said to have an application in all or most contraries, and the *subject middle* was said to be given in all opposites, contradictories alone excepted.¹

§ 454. The question thus arises,—Can we have a form of opposition that is so extensive as to include every *subject*, as well as to exclude every *forma media*? If we take the abstract formula of contradiction or Immediate Contrariety already given, we should have something like this: A—any given subject whatever—is either B or not-B. Everything we definitely conceive—every concept we can make—falls under one or other of those heads. A belongs to this definite class of things or thoughts, or it does not. This is obviously an allowable form of thought about things or concepts. A lies in (B) or not-B. But this kind

of opposition is only truly possible between a definite and indefinite class of things, regarded as predicates. And the moment we substitute for A any subject whatever, a definite concrete subject, we have an illustration of Immediate Contrariety, and consequently of the possibility of a *medium subiectum*, or subject that is neither, because incapable of one or other. As, *animal* is either *organised* or *not-organised*; but *volition* is neither, as belonging to a sphere incapable of the one or the other. It would thus seem that the only absolutely

¹ Compare Zabarella, *In Lib. Prædicament. Tabula. Opera Logica—Francofurti*, 1608, pp. 127, 670.

comprehensive contradictory—that which excludes every *media forma*, and at the same time includes every *medium subjectum*—is the abstract formula, *A is either B or not-B*, translated into the most abstract of all concepts, *being and not-being*, when we should have *A*—any subject whatever—*either is or is not*. There is here no medium possible, either of form or of subject. For between the *is* and the *is not* there is no middle form, and nothing whatever can escape lying within one or other of those terms, *being and non-being*.

(a) The following passages contain the essential points of the doctrine of Aristotle on the subject of Opposition :—

Contradiction lies essentially in this, that in the negation of what is affirmed, and in the affirmation of what is denied, no middle or third can intervene. There is thus the mere or simple negation of the other. These propositions are said to be contradictorily opposed,—*ἀντιφατικῶς ἀντικείμεναι*. Thus, *every man is white*; *not every man is white*—that is, *some man is not white*. But if you oppose *every man is white* to *no man is white*, this amounts to more than mere negation, for it asserts something new, and this is as far as possible different from the other, and is manifestly contrary opposition—*ἐναντίας ἀντικείμενον*.

Those which in the same genus are the most distant from each other are defined Contraries.—(*Cat.*, vi.)

I say, therefore, that affirmation is contradictorily opposed to negation. When the one enunciation is universally significant, the other is not universally so in the same thing itself, as *every man is white*, *not every man is white* [that is, *some man is not white*]; *no man is white*, *some man is white*. There is contrary opposition when there is affirmation of the universal and negation of the same universal, as *all man is white*, *no man is white*; *every man is just*, *no man is just*. These, therefore, cannot be both true at the same time.—(*De Int.*, vii.)

Contradiction suffers no middle, Contraries admit a middle.—(*Met.*, x. 4.)

Contradiction is opposition, in which nothing intervenes between the twofold enunciation by itself; but part of the contradiction is one affirmation, by which something is drawn to something, the other negation, by which something is removed from something.—(*An. Post.*, l. 2.)

All contraries, Aristotle holds, must be either in the same genus, or in contrary genera, or be genera themselves. Thus *white* and *black* are in the same genus of colour; *justice* and *injustice* in contrary genera—viz., *virtue* and *vice*; and *good* and *bad* are themselves genera. But the truth is, that in the examples here given, *justice* and *injustice* are as much in the same genus as *black* and *white* are,—in that, to wit of *ethical quality*, and *good* and *bad* may also be referred to one genus, viz., *quality*. So that contraries come to be the opposites of the same class. And thus the exception indicated by the *forma media*, and intermediate possibility, paralyses the strictness of the predication all

through contraries. The middle subject to be found in all contraries is really that which distinguishes Contrary from Contradictory Opposition, as Aristotle himself virtually says. The opposition of Affirmation and Negation is, he tells us, different from all the other modes of opposition, since in it alone it is always necessary that the one should be true and the other false. This is not always necessary in contraries, nor in Relatives, nor in Habit and Privation. *Health* and *disease* are contraries, yet neither of them is necessarily true or false; *double* and *half* are relatives; *sight* and *blindness* illustrate Habit and Privation; yet neither of these is necessarily true or false. What is predicated without conjunction is not necessarily either true or false, and all the above named are predicated without conjunction. It is clear from this that contrariety rests all through upon the assumption that we are dealing with things classed. The subject in contrariety may be a class notion, or it may be an individual, and the sphere of our predication is limited to classes or qualities that may as a matter of fact or experience belong to it. The subjects spoken of are supposed to have natures or constituent qualities which distinguish them from other subjects, with different natures or qualities. Here, therefore, the Laws of Identity and Diversity are assumed and employed, in reference primarily to the subject of the proposition. This necessity of being true or false may appear to happen in contraries, but it is not so. "Socrates is well," "Socrates is sick." While Socrates lives, one will be true and the other false, but when he is dead both will be false. But in affirmation and negation, one is always either true or false, as *Socrates is sick*, *Socrates is not sick*. When he exists, one is either true or false; when he is dead, one is either true or false, ~~for~~ that he is *sick* is false, but that he is *not sick* is true — (Cf. *Cat.*, x.)

But it may be said that Socrates *dead* is no longer capable of sickness, and, therefore, that the *not-sick* does not apply to him, any more than to a stone. And, therefore, that here the dead or mouldering Socrates is a *subjectum medium*, and consequently that we have not a true contradictory. If we throw the matter into a hypotheticalal form, i.e., limit the sphere of the subject,—we may have contradiction within the same class of things, as Socrates,—a supposed sentient organism,—is *either sick or not sick, well or ill*. If *Socrates is living*, he is *either sick or not*. He is not both, but he must be either. If Socrates is alive, he has *either a fever or not*. Both cannot be true: one must. If one is true, the other is false; if one is false, the other is true. So that the affirmation and negation of Aristotle here illustrated does not differ essentially from what is called Immediate Contrariety. *Every number is either even or odd*. *This payment is either just or unjust*. Given an object of a specific or known nature, and you are able to state two alternatives regarding it which are purely contradictory, both of which cannot be held regarding it, while one must. *Body is either white, or not white*—is a true contradictory, though there are things incapable of colour. *Body is either red or green*, is not from the terms or form a true contradictory, for it does not preclude formally the possibility of its being *blue*. The proper contrariety is contrariety with a *medium forma*. The *medium subjectum* is perfectly compatible with contradic-

tory opposition, for the essence of this lies in the absolutely exclusive form of the predication.

§ 455. The statement that the law of Non-Contradiction is not "absolute," has already been dealt with.¹ It is enough here to say that it is "absolute," or that the contradictory concepts are completely mutually exclusive in all our conception, and in all our true or even possible knowledge of objects. Even suppose we introduce the element of time and succession through the changes of a permanent subject or substance, the law cannot be described as not absolute.

"Ice the solid, water the liquid, and steam the gas, are three states of one natural object; the condition of each state being a certain amount of heat." We shall find on examination that the main thing implied in saying that there is one natural object here or substance, through all the changes of state, is the weight of the original substance. This remains the same all through the changes,—as does also the weight of the two gases, oxygen and hydrogen, which alone are found in it.² But though there be a substance here capable of transmutation into contraries, if you choose, would any one reasonably say that these states, as objects of sense, are not different or opposed? Would it be correct here to speak of the opposition, so far as perceived by us, in successive varying times, as "not absolute"? And to apply such an expression at all—especially without careful explanation—is it not misleading, and a mere mixing up of totally different points of view?

§ 456. But the statement that this law is not absolute, destroys the statement that the law is not absolute. This is the same as to say, there is absolutely no *no*; and when I deny the absoluteness or complete mutual exclusiveness—Or, which is the same thing, assert the compatibility of two contradictory propositions—I destroy each, even that one in which I make the assertion. There is no longer either assertion, affirmation, or denial. The test of contradiction as a criterion of the absurd falls to the ground.

(α) Much confusion on this point has arisen from inaccuracy in determining what, in point of fact, are contraries and what contradictions. Thus, *I am conscious*, or *the Ego and its conscious mode*, are

¹ See above, p. 120.

² Huxley.

not true contradictories. For they are not mutually incompatible either in thought or existence; on the contrary, we do not know, as we cannot think the one without the other.

The mode is *me* partially, for it is *mine*, and I am in mine. But it is in no sense a contradictory of me. It does not exlude me. It involves me, as I am in it. There is mutual involution, not mutual exclusion or abolition.

The true contradictory of *I am* is *I am not*. These are mutually exclusive, in thought and being. The true contradictory of *I am conscious*, is *I am not conscious*. In *I am conscious of what is not-me*—of extension, resistance, &c., there is no true contradiction; for my consciousness of the not-me does not abolish the *me*, or the *me conscious*. The true contradictory here of *me* would be *I am the not-me*, or *I am consciously the not-me*—the extension, the resistance I perceive. I am confronted with a negation of myself; but I am not the negation. I must even be in order to be so confronted. The negation does not make me to be or to be conscious; it is only possible through my being, and my being is realised in me as successively conscious, even though only conscious of ideas in me.

§ 457. A question may be raised in regard to the two contradictories,—the two inconditionates—the Absolute and Infinite in Hamilton's doctrine of the Conditioned,—which is of fundamental importance, though I do not chance to have met with it among the critics. It may be said that the two opposites—*e.g.*, an absolute beginning of being and an infinite non-beginning of being, or of time—cannot be regarded properly as contradictories, because we cannot, *ex hypothesi*, conceive either. When we cannot form a definite conception of an object, we are not entitled to say that this other conception, itself also indefinite or negative, is the contradictory of the former. If I cannot positively conceive time or being as absolutely commencing—commencing without being or time before it,—how can I say that an infinite regress of time or being, which I can as little positively conceive, is its contradictory?

§ 458. In reply to this it may be said, in the first place, that two contradictories do not require to be equally definite. If I definitely know one object, in its quality or qualities, I am able to say that the mere negation of these qualities is the contradictory of the object—as, for example, *organised* and *non-organised*,—as *one* and *none*,—as *living* and *dead*. And this is not necessarily anything definite. But, in the second place, it may be urged that, in respect of the two inconditionates, I can conceive neither positively, and conse-

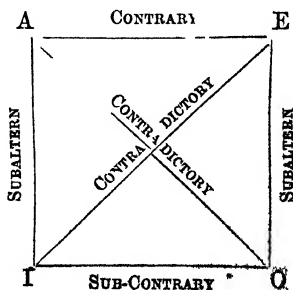
quently I have no definite object to negate. Hence a contradictory opposite is impossible, and hence also I could not be justified in saying that of the two inconditionates one or other must be real or true. This seems, however, to be an objection more apparent than real. All that is necessary to be able to say that these two forms of thought or speech are contradictory, is to be able to understand what is intended to be designated by them. The contradiction here is thus, indeed, purely formal or terminal. It means merely that if we were able to think positively each of those inconditionates, we could not but regard them as contradictories. We can say of the abstract term or form of thought, an infinite non-commencement, that it is contradictory of the abstract term or form of thought, an absolutely first or commencement. Unconditional limitation and unconditional non-limitation are in a contradictory relation. The statement, therefore, of such contradictories would be, though purely hypothetical, still effectual. It would mean that if any object were thought as infinitely non-commencing, and as absolutely commencing, these would be contradictory conceptions. And if it were proved that the one alternative is impossible or unreal, the other is necessarily possible or real. But it must be admitted that this alternative inference has no force, unless we first of all accept being or time as a positive datum, or fact; and then try to think it as either absolute or infinite. We begin with a conception of being in some form—space, time, quality—and we try to think it as the inconditionate of limitation, absolute, finished, completed, or as the inconditionate of non-limitation, endless, unfinishable, and we find ourselves unable to do either; and yet there being something thought, and thought as real, it must be in either of those two alternative inconceivabilities,—either capable of being absolutely determinate or infinitely indeterminate. In the sense, therefore, of terminal formulæ, these inconditionates are legitimate contradictories; and as applied to any object of possible thought, they are hypothetically mutually exclusive.

CHAPTER XXVIII.

IMMEDIATE INFERENCE—OPPOSITION—CONTRARY—CONTRADICTORY
SUB-CONTRARIES—INTEGRATION.

§ 459. True logical opposition thus arises only when there is such an incompatibility between two judgments that the holding of the one necessarily excludes the holding of the other. In other words, both propositions cannot be true, or held together consistently. In opposition, thus, the first essential point is that the propositions have the same subject and predicate, the difference being in quantity or in quality, or in both. With a given subject and predicate, a proposition being stated, there is necessarily inferred the removal or falsity of another proposition, the opposite; even in some cases the removal or falsity of the one gives the positive or truth of the other

§ 460. The table of Opposition usually given is as follows:—



The provision that the subject and predicate must be

identical in the two propositions, relieves us of two grand mistakes:—

(1.) That there is opposition between what is known as Sub-contraries, that is, a particular affirmative and a particular negative proposition, even though these relate to the same genus, as *some man is learned, some man is not learned*, for the identity of the subject, that is, the part of the class, is not here guaranteed, and therefore there is no ground for opposition. Both may be true; a third judgment is required to tell us that the *some* in the two cases is identical. This alone shows that the terms of the judgment are not, *per se*, mutually exclusive, and there is thus neither opposition nor immediate inference.

(2.) That contradiction may subsist between judgments whose predicates are opposed contradictorily; whereas contradiction only exists between judgments whose subject and predicate are identical, and in which accordingly the affirmation and negation bear on the same thing or point. It is, in fact, *secundum idem, ad idem, ex eodem*. This is really the doctrine of Aristotle, and it is the sound one.¹ Thus *organised* and *non-organised* are contradictory predicates, but can form part of contradictory judgments only when predicated of the same subject. The importance of this principle will appear in reference to certain theories of Reasoning.

(a) An elenchus is a contradiction of one and the same, not of a word, but of a thing; and of a word not synonymous but the same, collected necessarily from the data, not co-enumerating the original question; according to the same, and with reference to the same, in a similar manner, and in the same time.—(*Soph. El.*, v.)

(b) All opposites are diverse; but all diverse are not opposites, as *whiteness* and *sweetness* in *milk*. These can be predicated of the same.

Opposites are those which cannot be truly predicated either of themselves in turn, or of the same third, according to the same (part), in reference to the same, and in the same time.—(Duncan, *Inst. Log.*, i. 13.)

(1.) According to the same—i.e., the same part—as *white* and *black*.

(2.) To the same—*double* and *half* are opposed, and yet the same may be *double* and *half*, but not to the same.

(3.) At the same time—*heat* and *cold*, *sight* and *blindness*, *riches* and *poverty*. The same man may be *hot* or *cold*, but not at the same time.

—(Cf. Arist. *Soph. Elen.*, c. v. Duncan, *Inst. Log.*, i. 13 § 1.)

Heat may be predicated of the subject of *whiteness* and *blackness*, though *whiteness* and *blackness* cannot be predicated of the same.—(*Ibid.*)

¹ Cf. Knauer, *Conträr und Contradictorisch*, 1868.

(c) Aristotle tells us that some propositions are opposed *κατὰ λέξιν* (vocem), others *κατ' ἀλήθειαν* (veritatem).

Thus, (1.) *the dog barks* and *the dog does not bark* are opposed according to expression, but not according to truth. The domestic dog barks, but not the constellation. Here there is no opposition in meaning.

(2.) *Some man is just*, *some man is not just*, are opposed merely according to expression, for the *some* is uncertain and may refer to different parts of man—say, Cicero and Catiline. These propositions may both be true, and as such they are not properly opposites.

(d) Duncan (so Thomson, *Outline*, p. 193) holds that sub-contraries cannot be both false. He argues that if it be false that *some man is just*, the contradictory will be true that *no man is just*. If it be false that *some man is not just*, the contradictory will be true that *all man is just*. If, therefore, these are both false,—*some man is just*, *some man is not just*—the following will be both true, that *every man is just*, and that *no man is just*.—(*Instit. Log.*, ii. vi.)

Some man is just; *some (other) man is not just*. *Some man has the mark Y*; *some (other) man has not the mark Y*. If it be false that *some man has the mark Y*, then it is true that *some man has not the mark Y*. If it be false that *some man has not the mark Y*, then it is true that *some man has the mark Y*. These thus may be true together; but they cannot be false together.

Might it not be in regard to sub-contraries that man is neither just nor unjust, but simply not acting, or acting in circumstances where neither justice nor injustice is possible? All man may conceivably be sleeping or fishing, or shooting, or running, &c.,—and some or no part, therefore, acting either justly or unjustly. When sub-contraries cannot be both false, we are supposing *some men*—the subject—to be acting in circumstances to which the predicate is possibly and naturally applicable—that is, a certain or definite *some*.

§ 461. The contradictory opposites usually given are A and O, E and I. Thus (A), *all X is Y*; (O), *some X is not Y*.

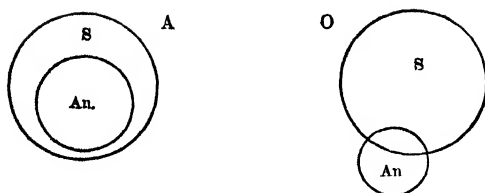
(E) *No X is Y*; (I) *some X is Y*.

The rule is, position implies sublation; sublation implies position. There is no medium between contradictory opposites. If A be posited, O is sublated; if O be posited, A is sublated; and so of E and I.

Posit, *All animal is sentient* (A); sublate, *some animal is not (any) sentient* (O).

Posit, *Some animal is not (any) sentient* (O); sublate, *all animal is sentient* (A).

If we sublate O, *some (even a part of) animal is not sentient*; we posit A, *all animal is (some) sentient, that is, every one is*.



It is not true that *some men are not civilised*; therefore it is true that *all men are civilised*.

Posit, *No miser is (any) happy (E)*; sublate, *some (even one) miser is happy (I)*.

Posit, *Some (at least) miser is happy (I)*; sublate, *no miser is (any) happy (E)*.

§ 462. Thomson disputes the propriety of regarding A and O as contradictories. He says, "the fact is, that we cannot tell from the removal of O whether we ought to replace it by A or U. Let the O, *some men are not rational animals*, be removed, that is, its truth denied, and that removal will not establish the A, that *all men are (some) rational animals*. A third judgment is possible, namely, that *all men are (all) rational animals*,—the only rational animals there are; and which of these two is to apply cannot be inferred from the O, but must be inferred from the facts of the case."¹ This criticism proceeds on a misconception of what logical illation is, and the confusion of formal and material sequence. In logical illation we have not to consider what is possible in inference, but what is necessary—in fact, the necessary consequent is all with which we have got to do. And in this case the necessary consequent and the only one is A, or, *all men are (some at least) of rational animals*. If it be not true, or rather if it be denied, that *some (even some) men are not rational animals*, it follows that *all men are rational*—that is, *some of rational animals at least*. Whether *all men be all rational animals*, or *all the rational animals that are*, is not decided, and it is irrelevant. What we have only to look for, or need to look for, in such a case is a proposition which necessarily follows *at least* from the denial of the original one, whether this inferred proposition represents all the truth or not.

¹ *Outline*, p 190.

§ 463. But while this criticism is inept, the ordinary theory is open to objection, and needs amendment. *Some* seems to have three distinct meanings, and it is only in two of these that the contradiction between O and A is sustained. (1.) *Some*, taken in its ordinary logical acceptation, means *some at least*, perhaps *all*, I don't know whether or not. If, then, I deny that *some at least of men are not civilised*, I do not necessarily assert that *all men are*, I only imply that *some are civilised*, though I do not know whether the whole are, whether even others are or not. This is the extreme of indefinitude, and here O does not yield A as contradictory, but only I.

(2) If *some* means *some only*, and I deny that *only some men are not civilised*, I imply that *all men are civilised*,—that is, O implies A as its contradictory. *Not some only are* clearly means *all are*. *Some only* is thus seen to be tacitly and without proper acknowledgment accepted in the ordinary logical formulæ.

(3.) *Some* may be taken as meaning *even some*, or *even some part*. Thus, *even some part of man is not without a sense of a transcendent Being*. This (O) implies (A) that *every part of man or all man has a sense of transcendent Being*. This comes very near the definitude of any—*ullus*. It is denied that *some (even one) X is not Y*, therefore *every X is Y*.

(a) *Some (at least)*. This is all that is necessary to a Particular Proposition. To sublate Universality, *some one* requires to be excepted.

Between *some (plural, several)* and *none*, there intervenes *some one*. To deny that *all the apostles of Christ were faithful to their Lord*—it is not necessary to assert *several* were unfaithful, but only *one*—*some one*.

It ought to be noted that while of contradictories one is always true and the other false, it often happens that we cannot, as a matter of fact, tell which is true or which is false. This happens especially in future contingents. Thus, *it will rain to-morrow, it will not rain to-morrow*; but which is true or to happen we cannot determine.¹

§ 464. Contradictories, considered in reference to the subject, are of two kinds—(a) The subject in the one is a Universal, or (b) a Singular, certain, and designate,—as *every man is just, not every man is just*—*Cato is just, Cato is not just*.

¹ Duncan, *Instit. Log.*, vi. 2.

In the case of the universal subject, the contradiction requires difference both in quantity and in quality, or between A* and O. These two forms are expressly recognised by Aristotle.

(a) With Aristotle contradiction is of (1.) Universals, as, *all man is white, some man is not white; no man is white, some man is white.*

(2.) Singulars, as, *Socrates is white, Socrates is not white.*—(Cf. *De Int.*, c. vi. vii.)

(b) Occam recognises a form of Contradiction which he names Inferential. Thus, *no animal runs, some man runs.* The latter implies the contradictory of the former, for if *some man runs, some animal runs.*—(*Summ. Log.*, i. 36.) This, however, is not contradictory to any one who has not identified *some man* and *some animal*. It thus makes no new form.

§ 465. On Hamilton's system there is no contradiction between any two propositions which contain *whole* and *part*. The only true contradiction is between Singulars and Totalities indivisible, that is, regarded as Singulars. *Socrates is sick; Socrates is not sick. The whole of A is (identical with) the whole of B.*¹

In the doctrine of the Opposition of Propositions, the modifications introduced by Hamilton arise mainly from the semi-definite meaning of *some*, as *some at most, some only*.

Some, according to Hamilton, is always thought as semi-definite—that is, *some at most* or *only*, when the other term of the judgment is universal. Thus, *some animals are (all) carnivorous*, means negation of *all are carnivorous*—that is, *not all are carnivorous* or *some only of animals are carnivorous*. (*Only*) *some sunsets are stormy*—that is, *others are not, or not all are*.

In the case of Subalterns, we infer I from A and O from E—*All is some, ∴ some is some; all is not, ∴ some is not*. This only holds good if we mean *some at least*. If we mean *some only*, the two propositions are inconsistent—that is, they cannot both be true.

* Thus, *All African is (some) black (only); ∴ some African is (some) black (only).*—(Afl, IfA.) *All men are copper-coloured; some men only (not all) are copper-coloured*—are inconsistent. *Some horses (only) are not swift* is opposed to *no horses are swift*.

§ 466. In Subcontrary Opposition (so called) there is an inference from *some only* to *some other*. If I say *all men*

¹ See Bowen, *Logic*, p. 173.

are some animals or some animals are all men, I can infer all men are not some animals, or some animals are not some men. Some animals only, implies that men are a certain some, and not any other animals, or other part of the class. This inference Hamilton calls Integration, inasmuch as it is a completing of the whole, of which a part only has been given.

§ 467. Under Immediate Inference, Hamilton further latterly included the two forms of Hypothetical Reasoning,—the Conjunctive and Disjunctive. This doctrine appears in the note to “The Essay on the New Analytic of Logical Forms” (1850). “All mediate inference is one; that incorrectly called Categorical; for the Conjunctive and Disjunctive forms of Hypothetical Reasoning are reducible to Immediate Inferences.”¹ The nature of Hypothetical Reasoning had occupied Hamilton’s attention specially for some time from 1848 to 1852. Certain fragmentary results are given in the Appendix to the Lectures on Logic.² From these we gather that he held all inference to be hypothetical, and that what have been called Hypothetical Syllogisms are not more hypothetic than others. In one of the fragmentary papers, he says that Aristotle in ignoring them as forms of reasoning, was right, that they are not composite by contrast to the regular Syllogism, but more simple, that if inferences at all they are immediate, not mediate, that they are not argumentations, but preparations for augmentation, as only putting the question in preparation for the syllogistic process. Hamilton cannot be said to have reached a conclusion on this subject wholly definite, clear, or satisfactory. He inclines on the whole to the view that Conjunctive and Disjunctive Syllogisms are reducible to forms of Immediate Inference, at once resembling and different from each other.³

(a) In 1848, he gave as kinds of Immediate Inference, i. Sub-alternation; ii. Conversion; iii. Opposition, (a) of Contradiction, (b) of Contrariety, (c) of Sub-contrariety; iv. Equipollence; v. Modality; vi. Contraposition; vii. Correlation; viii. Identity.—(*Logic, App.* VIII. iv. p. 373.)

¹ *Discussions*, p. 651.

² *Appendix VIII.*, vol. iv. p. 369 *et seq.*

³ *IV.* p. 387.

CHAPTER XXIX.

MEDIATE INFERENCE—REASONING—ITS NATURE AND LAWS—
 THE SYLLOGISM—ORDER OF ENUNCIATION.

§ 468. Inference in every form means necessary implication. In other words, given a certain proposition or statement, another proposition or statement must also be admitted along with it or in consequence of it. That other statement is implied in it, and necessarily implied in it. This is inference,—the first form of Inference,—Immediate Inference. Thus, if I say: *No Christian can be cruel to the creatures whom God has made*, I am entitled to say that *the man who is cruel to these creatures is not a Christian*. If the first proposition be granted, the second must be granted. The first proposition may, of course, be disputed; but, given that, the second follows, and necessarily follows. Thus the inference is immediate; that is, I do not need any third or other term beyond what I have in my original statement to warrant my inference.

A single proposition may thus yield an inference, apart altogether from what is called reasoning. And one of the most necessary things in our ordinary practical dialectic is simply to be able at once to catch at the immediate inference which a statement implies,—unknown, it may be, to the person who makes it. Every proposition, if we but definitely understand, and, much more, definitely state the character of our terms, must yield a direct or immediate inference.

§ 469. But there is another kind of Inference besides this,—the inference which we usually call Argument or Reasoning. Now, what is the type or form of a perfect reasoning?

It is that I have two propositions, not one merely, as in the case of Immediate Inference, and out of these two I not only get, but I am obliged to get a third. This, for example, will stand as a type of reasoning:—

(A)	(B)
<i>A free-intelligent is responsible ;</i>	
(C)	(A) ‘
<i>Man is a free-intelligent ;</i>	
(C)	(B)
<i>Therefore, Man is responsible.</i>	

Now, the conclusiveness of this reasoning—*i.e.*, the connection between the premisses and the conclusion—is entirely independent of the matter or subject about which we reason. It is of no consequence whatever what the terms of the reasoning are, whether they are *free-intelligent*, *responsible*, and *man*, or what they are. These may be quite changed, yet if we preserve the connection between the terms, our reasoning will be equally valid or conclusive. Thus, suppose I substitute for *free-intelligent*, *A* ; and for *responsible*, *B* ; and for *man*, *C* ; then I might reason thus:—

Every A is B, ‘
Every C is A ;
∴ Every C is B.

It matters thus nothing what are the notions or terms of our reasonings,—the law of reasoning is the same. In technical language, the *matter* of our reasoning may vary ; but the *form* remains the same. I have got here, as it were, the mould of human reasoning. I care not whether it be applied to science, to ordinary matter of fact, to history, or to philosophy. The reasoning process is all the same in these. I have got the law, or form, or type of reasoning which runs through the infinity of things about which I can think. Amid changing matter, I have got the unchanging form,—the ideal of accurate sequence in thought. This is the conception which regulates the chaos of associated impressions. This is the golden band that runs through and holds together all the materials of thought.

(a) Mill's conception of inference is that of proceeding from known to the unknown, or from truths known to others really from them. Inference with him is of three kinds—from

particulars, particulars to generals, particulars to particulars. This last is the foundation of both the others.

(b) Mill, as might be looked for, rejects immediate inference, on the ground that there is no real progression from one truth to another,—the logical consequent being a mere repetition of the logical antecedent. This is not the case, as is clear from the illustrations given; and it is as incorrect to hold that there is only a change of expression in immediate inference; there is a distinction in judgment.

(c) Kant regards immediate inference as inference of the Understanding, mediate as that of the Reason.—(*K. d. r. V.*, p. 360; *Log.*, § 41.)

§ 470. Mediate Inference is of two kinds—viz., Syllogism and Induction. Syllogism proceeds (a) from the general to the particular, or (b) from the equal to the equal. Induction proceeds from the individual or from the particular to the general. Syllogism, in so far as it proceeds in the first line, is a reasoning from the higher or wider to the lower or narrower; Induction is a reasoning from the lower or parts to the whole or totality which is thus constituted.

(a) We believe all either through Syllogism (*συλλογισμοῦ*) or through Induction (*ἐπαγωγῆς*).—(*An. Pr.*, ii. 23.)

We learn either from induction or from demonstration (*ἀποδείξει*); demonstration is from universals, induction is from parts (particulars).—(*An. Post.*, i. 18.)

As the proposition in demonstration is a necessary one, and of immediate certainty, these statements of Aristotle are not to be construed as implying an empirical theory of knowledge.

§ 471. In this case we have Mediate Inference or Reasoning, because we have not merely two propositions, but because we have introduced into each of the two propositions or premisses a term common to both, called the *Middle Term*. And let it be observed that these two propositions are not merely arbitrarily or voluntarily connected. They are connected in virtue of the law of whole and part in thought. Thus, I may find or know from observation that the *crocus* is a *plant*, and I may find, further, that *plant belongs to the class organised*. Each of these propositions, taken by itself, would not lead me far. I might be able from it to state the proposition in another form, but that is not much. But if I put the two propositions together, —and I am led to do this because the term or concept *plant* belongs to or is common to both,—I shall find that a

proposition, distinct from either, necessarily emerges. I say, first of all, *every plant is organised*; then, *the crocus is a plant*; and thus I get the new proposition, that *the crocus is organised*, or, in virtue of its being a plant, belongs to the class *organised*. Now this, whatever view we may take of its nature, is the fundamental form and type of all human reasoning,—that to which valid reasoning may be reduced, and by which it may be tested. And if we seek to analyse the principle or law which regulates and necessitates this evolution, we shall find that it is analogous to that of whole and part,—that it is, in fact, that of genus and species. Thus, *crocus* is found to be a part of *plant*; *plant* is found to be a part of *organised*, therefore the whole *organised*, inasmuch as it includes the part or species, *plant*, includes also the part or species of plant—viz., *crocus*. There you have the ground-principle of direct or categorical reasoning,—that form of thought into which the working of the mind naturally and chiefly flows. This reasoning is called mediate, because we connect *crocus* and *organised* through their participation in a common notion or term—viz., *plant*.

(a) Reasoning, says Wolff, is an operation of the mind, in which, from two propositions having a common term, there is formed a third, by combining the diverse terms in both. Syllogism is an expression in which the reasoning (argument, *ratiocinium*) or discourse (*discursus*) is expressly set forth.—(*Logica*, § 50, 332.)

(b) What is a Reasoning? Hamilton, following Esser, in the *Logic Lectures*, brings out its nature and scope in this manner. We have before us two notions, which are opposed to each other,—repugnant or contradictory. We wish to know which is to be affirmed of a given subject. But we are unable from an examination of the notions themselves to determine this point. We are thus in doubt, and we must remain in this state of indecision, until we get further knowledge. The knowledge, moreover, must be a general rule which will extinguish the doubt. It must be a rule with an application to the present case.

For example, we have before us the two contradictory predicates *free-agent* and *necessary agent*. We ask the question—Which of these applies to *man*? Is man a free-agent or is he a necessary agent? How is this question to be decided, and the doubt solved? Not certainly by a mere inspection of the two contradictory predicates. But suppose I take one—say *free-agent*—and find by a competent process that a free-agent is one morally responsible, or that *every morally responsible agent is free*, I have thus advanced a step in the line of solution. Suppose I further find that *man is morally responsible*,—I have thus got two related propositions, or one notion related to the two notions, freedom and moral responsibility. Now the question or problem with which I

started may be solved, and I can with necessity or absolute certainty infer that *man is a free-agent*. Thus—

Every morally responsible agent is a free-agent ;

Man is a morally responsible agent ;

Therefore, man is a free-agent.

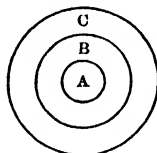
It is obvious that the cogency of the reasoning depends on the ascertained relations of the middle term, *morally responsible agent*, at once to *man* and to *free-agent*.

(c) To Mill it appears that we can never discover that two notions stand in the relation of whole and part, by comparing each of them with a third. *E.g.*, we should say this: *A is a part of B, B is a part of C*. By putting these together, we find that *A is a part of C*. Thus:—

(All) *A is a part of B (some B);*

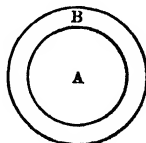
(All) *B is a part of C (some C);*

∴ (All) *A is a part of C (some C).*

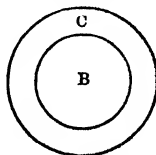


But Mill does not admit this. *A*, according to him, is perceived to be *A* and something more. We thus perceive *A* and something more to be a part of *C*, without perceiving that *A* is a part of *C*. In other words, we perceive that (all) *A is a part of B*, and that (all) *B is a part of C*. We must, therefore, have perceived from the very first, or before putting these two propositions together, that *A* was a part of *C*. Why? we ask in wonder. Because otherwise you would have the absurdity of supposing that you perceived *A* and something more to be a part of *C*, without perceiving that *A* is a part of *C*! Suppose we perceive in this way, according to the terms:—

(a) *All A is B.*



(b) *All B is C.*



Is the second proposition here an advance on the first or not? Is the one necessarily involved in the other? May I not know that *all*

mineral acids are poison, without knowing that salt is a mineral acid? Suppose a child being taught geography, might it not learn first that Jerusalem is in or a part of Palestine, without knowing that Palestine is in or a part of Asia? And once it knows these two things, would it not, through them, know, and necessarily know, that Jerusalem is in or a part of Asia?

Yet if Mill's contention be correct, the second is as necessarily involved in the first as the conclusion, *A is C*, is involved in the other two. As it has been well put, even if we grant "that we perceive *B* to be *A* and something more, quite as soon as we perceive it to be so, —quite as soon as we perceive *A* itself to be a part of *B*, how can we be said to perceive *A* and something more to be part of *C*, before we can perceive it to be so?" But the truth is, that Mill's assumption here is simply contradictory. It is this, that if *all or every A be a part of B*, it is *A* and something more. How possibly, if only *every A be B*, can *A* be itself and something more? What more, if only *every A be a B*? If every mineral acid be a poison, how is every mineral acid more than the poisons with which it is convertible? If a pound is a pound of lead, how can or why should a pound be more than a pound?

§ 472. The act of reasoning is, in Hamilton's view, as a mental act,—that is, once the relations of the three terms are grasped in the mind,—one organic, indivisible whole. We may state in language its different parts or propositions successively; but in the mental reasoning or in mutual relation, they have a wholly different significance from what they have considered apart. This significance is to be found in the light which they mutually reflect on each other in the reasoning. In consciousness the three notions and their reciprocal relations, the moment they are grasped, constitute only one identical and simultaneous cognition. To consider reasoning as a mere whole made up of judgments, is an illustration simply of "the mechanical mode of cleaving the mental phenomena into parts; and holds the same relation to a genuine analysis of mind which the act of the butcher does to that of the anatomist."¹

(a) The intellect knows in one act the conclusion of a syllogism; and also in that act the terms of the conclusion;—yet in that act it knows nothing incomplex of the conclusion. In the same act, thus, in respect of the conclusion there is knowledge, but no knowledge in respect of the terms.—(Occam, *In Sent.*, i. *Dist.* 1, qu. 1 L. Præf. ii. ix. 755.)

§ 473. Hamilton expressly and consistently holds that all

¹ *Logic*, L. XV. iii. p. 275.

inference,—be it mediate or immediate, be it categorical or so-called hypothetical,—is truly and ultimately hypothetical; and thus that what are called conjunctive and disjunctive reasonings, are not more hypothetical than categorical reasonings. In immediate inference, given a proposition, the question is, What are the inferences which its commutations afford? In categorical reasoning, given three notions, two related, and at least one positively to a third—what are the inferences, afforded in the relations to each other, which this comparison of the two notions to the third determines?¹ It is for this reason that he regards the terms *sumption* and *subsumption* on the whole the best names for the premisses. Logic considers these not as absolutely, but only as hypothetically true. Logic does not warrant their truth, it only guarantees the legitimacy of the inference—the necessity of the conclusion.

§ 474. Now there must be a law here—a law, necessary and universal—regulating my thought, and all human thought; and what is that? It is, that when you have generalised, or brought things into a class, you are entitled to affirm or to deny of the things contained in the class, what you may affirm or deny of the class itself. If, for example, I am entitled to affirm *responsibility* of a *free-intelligent*, and if I am entitled to affirm *free-intelligent* of *man*, I am bound to affirm *responsibility* of man. Now that is really the whole—the essence—of human reasoning. But observe the points here implied. When we have got the premisses, we must get the conclusion. That follows necessarily, or, as I have said, by necessary implication. But we may have a great deal to do in getting the premisses. This need not be disguised. The getting the premisses, or the best rules for getting them, belong to what we call Inductive Logic. But it is a very important thing all the same to be able to get the rules for drawing valid conclusions,—for keeping us right in our reasonings,—and that is what formal Logic professes absolutely to do, and can do.

§ 475. The ultimate law or rule which regulates categorical reasoning is a maxim founded on the laws of Identity and Non-Contradiction—viz., whatever belongs, or does not belong, to the genus, belongs, or does not belong, to the species or in-

¹ *Logic, Appendix iv. p. 371.*

dividuals contained under it—or, as it is more commonly put, in the words of the *Dictum* of Aristotle,—*Whatever is predicated, affirmatively or negatively, of a term distributed, may be predicated in like manner of everything contained under it.* This rule is a universal rule. It regulates all reasoning, whatever be the things or matter about which we reason. We may see this, taking for the terms of the reasoning letters of the alphabet, thus :

Every X is Y;

Every Z is X;

∴ Every Z is Y.

Or, *Y is predicated of X; Z is contained under X; therefore Y must be predicated of Z.* Terms related, as X, Y, and Z are in this reasoning, must necessarily give the same kind of conclusion, whatever these terms may happen to represent.

(a) Ueberweg holds “the most important doctrine in the whole of syllogistic” to be embodied in the following paragraph: “The possibility of the Syllogism as a form of knowledge rests on the hypothesis that a real conformity to law exists and can be known. . . . Perfect knowledge rests on the coincidence of the ground of knowledge with the real cause. Hence that syllogism is most valuable, in which the mediating part (the middle notion, the middle term), which is the ground of the knowledge of the truth of the conclusion, also denotes the real cause of its truth.”—(*Logic*, p. 337.)

It is a serious objection to this view (1.) that it implies a distinction of Syllogism as more or less valuable or valid, and therefore syllogisms of different grades. There is one law which regulates the essence and process of valid reasoning, otherwise there is no science or ultimate criterion of it. (2.) “The truth of the conclusion” is ambiguous. If it means the validity of the conclusion, that is one thing; if it means the absolute or irrespective truth of the conclusion, that is another thing.

Ueberweg supports his view by arguing apparently that unless the conviction of the universally valid truth of the premisses is not founded on the presupposition of a real conformability to law, it must first be reached by a comparison of all individual cases. If the latter alternative be true, the truth of the conclusion must be established ere we get the truth of the premiss or premisses. If, for example, all men be sentient, and Caius be a man, then Caius must have been known to be sentient ere we could say all men are sentient. We thus knew the truth of the conclusion before that of the premisses, and in order to get the universality of the premiss, must assume the truth of the conclusion. This is really the objection of Sextus Empiricus to syllogism—viz., that the major premiss can only be established by induction, and that this supposes the examination and testing of every individual, and hence that we fall into a *petitio principii* in syllogistic deduction.

If we say that *all animals move the under jaw*, this might be refuted by a single negative instance,—as, for example, the crocodile, which moves only the upper jaw.—(*Hypot.*, ii. 194.)

The answer to that is, we do not get the universality of the premiss through the comparison and enunciation of all particular cases. This is a simple impossibility, for cases under a concept or genus are ideally infinite, and need not be actual cases at all. There is a confusion here of generic and numerical totality. The universality from which we start is that of a class, constituted by certain definite attributes, one or a mark attaching to one of which may be stated as a predicate. All that we require to know to bring the individual—actual or ideal—under the predicate of the class, is to know that he possesses the marks of the class or genus,—that he is *man* in this instance. The predicate of the class or the mark of the predicate of the class may, therefore, become predicate of him,—the individual. We do not, for example, require to wait until Caius dies to predicate of him, *mortal* or *subject to death*,—for we are supposed to know that this is a mark attaching to *man* or some mark of *man*. We do not need to examine every kind or case of triangle to predicate equality of the three angles to two right angles, for this is a mark which is already attached universally to a three-sided figure, or to the class *triangle*, by implication in the definition.

Our inference would be perfectly good, and contain all the elements essential to inference, were we to say, if all men are sentient, and Caius is a man, he is sentient,—the question, as to how we get the universality of our major premiss, or whether it correspond to anything in reality or not, being wholly independent points. Our major may be a generalisation from experience, it may be the statement of an *a priori* law, or essential principle of reality, which no examination of individual instances could give; but in either case the conclusion from it may be stated in the form of hypothetical inference, its formal validity thus tested, and its character as the type of a universal formal inference in any kind of matter vindicated.

(1.) Is the middle term in every proper or scientific syllogism a cause?

(2.) Is the inference dependent on this, or is it dependent on the fact that a cause is only a case of coming under the law of whole and part?

It is not universally true, or nearly so, that “in a syllogism the ground of the knowledge of the truth of the conclusion also denotes the real cause of its truth” (Ueberweg, *Logic*, p. 337). If man be sentient, and Caius man, Caius is sentient; but the middle term man cannot be said to be the cause of sentience or of Caius being sentient. *Sentience* is a property of the class, and as such belongs to any discoverable member of the class,—known, possibly, to belong to it by other marks. Much less is this so in the case of a reasoning through equivalents, which obviously Ueberweg does not contemplate. A is equal to B, B is equal to C,—therefore A is equal to C. A may be known to be equal to B for a hundred years before B is known to be equal to C, and yet until this discovery is made, there is no possibility of the conclusion. And would any one say, in this case, that the middle

B is a cause, or the cause of the truth of the conclusion? It is certainly the ground or condition, but cause it is not in any proper sense of the word. The relation in which it stands to the other terms is much wider than anything embraced under Causality.

In the second place, even where the middle term may be a cause, the conclusion does not depend on the relation of cause and effect for its necessity, since there is no example of the relation of cause and effect in our experience which is necessary, or the opposite of which cannot be represented in thought. The example given by Ueberweg is: "An opaque body which comes between a luminary and a body which, dark in itself, is light by means of the other, causes an eclipse of the latter. The earth is an opaque body which, at certain times, comes between the luminary, the sun, and the moon which is dark in itself and made luminous by the sun. Hence, at certain times, the earth causes an eclipse of the moon."

The force of this reasoning does not depend at all on the causal relation of an opaque body to the eclipse, but on the circumstance of its universality; otherwise it would not take place in the case of the earth. We may get at the universality through the causality; but get at the universality we must somehow, ere we can include the special case, and thus we depend on the reference to the class, not the reference to the cause, for the validity of our conclusion. In a word, we fall back on the formal reference, in the case of a class constituted, it may be, by the relation of causality, but still constituted somehow, and by us accepted as universal. It is only now that our inference can reach the character of necessary implication. The particular effect does so happen in the circumstances, or from the cause (or causes); but that it must do so, we could not before experience have told,—that it must always do so, we cannot, after experience, assert,—and, therefore, we never would, from this relation alone, say that the eclipse of the moon must follow from the position of the earth.

§ 476. Aristotle thus enounces the 'supreme' Canon of Syllogism:—

When it is said that a thing is in the totality (*ἐν ὅλῳ*) of another, or that a thing is attributed to all of another (*κατὰ παντὸς*), these expressions are the same in sense. To say that a thing is attributed to all of another (or to another in its entirety), is to say that we suppose there is no part of the subject of which the other thing cannot be said; and, in the same way, the not being attributed to any.—(*An. Pr.*, i. 1.)

We have here apparently a formula of the Syllogistic Canon, which is much wider than most subsequent logicians have supposed, or at least accepted and applied. The Canon takes in reasoning alike in Extension and in Comprehension.

"To be comprised in the totality," "to be attributed to

all," are different expressions, with the same logical effect, referring to different aspects or forms of reasoning.

The former refers to the subject as forming part of the extension of the predicate—as, *all gold is (some) metal*. The latter refers to the predicate as forming a part of the total comprehension of the subject—as, *every mineral acid is a poison, or has the mark poison*. The former proposition states the relation of the part to the whole (species to genus); the latter states the relation of the whole to the part—as *mineral acid* to its part or one of its marks, *poison*. The one is the relation of the particular or species to the universal or genus; the other is the relation of the universal to the particular, or at least the complex to the particular or individual mark.¹

(a) Trendelenburg, however, remarks that the expression *ἐν ὅλῳ εἶναι τῷ μέσῳ*, signifies only that the subject is as a part in the whole genus. The proposition *ἐν* does not indicate the mark which is in, but the species which is under, the genus. In *Categ* V. we have, as some man is in the species man (*ἐν εἶδει ὑπάρχει*). But this refers only to one form of the expression.

§ 477. An argument exhibited in strict form is called a Syllogism. This consists of two propositions or premisses, and a third or conclusion. Of these, one proposition is called the *major*, the other the *minor*. Of the three terms one is *major*, another *minor*, a third *middle*.

There are three terms in every Demonstration, and no more. The syllogism is made up of two propositions. The three terms constitute two propositions.²

§ 478. The Syllogism may be defined as "an enunciation in which certain propositions being posited, another proposition different from these necessarily follows, because of this only, that these are posited. When I say because of this only, that these are posited, I mean that it is because of these that the other proposition follows, and by following from these I mean that there is no need of any extraneous notion in order to effect the necessary conclusion."³

(a) Aulus Gellius, speaking of Aristotle's definition of Syllogism, describes it thus. "Syllogismus est oratio in qua consensus quibusdam

¹ Cf. St Hilaire, *in loco*.

² *An. Pr.*, i. 25.

³ *An. Pr.*, i. 1. This definition is repeated almost verbatim—*Top.*, i. 1, § 3.

et concessis, aliud quid, quam quæ concessa sunt, per ea, quæ concessa sunt, necessario conficitur" (xv. 26). On this Trendelenburg remarks that *τεθέντα* and *κείμενα* are wider than *concessa* and *consensa*—the latter referring to what is granted by an opponent, the former to what holds through the force of the things themselves.—(§ 21.) But so far as the formal inference is concerned, this matters nothing.

(b) The necessary with Aristotle, as Biese pointedly remarks, is either simply *per se* or absolute, on account of which others are; or hypothetical, which is on account of others.—(Trendelenburg, § 21.)

(c) Syllogism is literally and essentially collection into one. This may be from and through the general, as in Deduction, or through the particular, as in Induction. Etymologically *συλλογίζεσθαι* is to conjoin by reckoning or reasoning. In Plato it means to collect into one what follows from two statements posited, and usually the ascertainment of the universal from the particular.—(See *Theætetus*, p. 186^d; *Phædrus*, p. 249^b; *Phil.* 41^c.) By syllogism Aristotle means such a union of three notions that the third and first can be joined or collected in one enunciation—as man and animal through mortal, or A and B through a common C. When Aristotle speaks of syllogism from induction (*δὲ ἐξ ἐπαγωγῆς συλλογισμός*), he is influenced by the earlier and more general meaning of the word,—collection generally.—(Cf. Trendelenburg, *in loco*.)

Συλλογισμός is literally a *reckoning all together or up*, and logically it is a reckoning or bringing together before the mind of premisses so as to be summed up or completed in one conclusion. The same idea is conveyed in *colligere*, *collectio*. Cicero's equivalent to *συλλογισμός* is *rationcinatio*. In the widest sense with Aristotle, *συλλογισμός* may be based on the merely general, or on the necessary in which case we have demonstration. Or it may even refer to particulars, and in this case we have a syllogism from induction.

On Hegel's blunder about the Syllogism and Aristotle, see Waitz in *An. Pr.*, i. p. 371. After quoting the Aristotelic definition, Waitz says: "Quare non recte Hegel (Wke, xiv. p. 408) 'Der *συλλογισμός* ist ein Grund (*ἐστὶ λόγος*, Begründen) in welchem wenn Einiges gesetzt ist, ein Anderes als das Gesetzte nach der Nothwendigkeit folgt; 'neglexit enim verba τῇ ταῦτα εἶναι bene expressa a Biesio l. p. 130, 'so dass sich dieses an jene in mittelbar anschliesst,' neque recte vertit *λόγον*, quem haud scio an optime reddamus Gallico vocabulo utentes, 'raisonnement' (*raison*, *λόγος*)." In fact this is but an illustration of the inaccuracies which pervade the impossible encyclopædic knowledge of Hegel. He is a man who frequently speaks at second-hand, and his representations of Aristotle are on a par of inaccuracy with his representations of Descartes. What with his preconceived formulæ and his pretensions to cover the whole field of philosophy, Hegel is about the least trustworthy of men who have professed to represent historical opinions.

§ 479. Aristotle's point of contrast between Induction and Syllogism is, that the former yields knowledge through particulars; the latter through generals. Particulars are more

known to sense, generals are nearer to the productive principles of nature. For example, *all generous metal is ductile ; gold is a generous metal ; therefore gold is ductile* : this is a specimen of Syllogism. On the other hand, Induction depends on particulars. Thus *gold, silver, iron, and the rest are ductile ; therefore, all metal is ductile*. Or, *the angles of every parallelogram are equal to four right angles. A rhombus is a parallelogram, therefore the angles of a rhombus are equal to four right angles*. By induction we have—the angles of a rectangle, square, rhombus, rhomboid, are equal to four right angles, therefore the angles of every parallelogram are.¹

(a) Ἐπαγωγή, literally *a bringing to or on*, was translated by Cicero *Inductio*. In the phrases ἐπαγεῖν λόγον (*Met.*, i. vii.), παραδείγματα, the term might appear to be better translated by *afferre* than *inducere* ; for in ἐπαγωγή certain singulars are brought to (afferuntur) and almost piled up (congeruntur). But *inductio* has this meaning, and reasons are said to be induced (induci) (Cicero, *Fat.* 10.) With Plato ἐπαγεῖν and ἐπαγωγή have not this logical signification.—(See Trendelburg, *El. Log. Ar.*, § 20.) In a military sense, ἐπαγωγή is bringing up one body after another—that is, in a consecutive order. With Aristotle, and logically, ἐπαγωγή in its widest sense is the bringing to or forward of particular or individual instances, in order to form or reach a general conclusion.

§ 480. The premisses, as in a Syllogism, are called by Aristotle προτάσεις. Among the Latins, the major premiss is known as *propositio*, the minor as *assumptio* ; the conclusion is συμπεράσμα, because it follows from the union of the terms (πέραιτα)—(*An. Pr.*, i. 9 ; ii. 6) ; συμβάλλειν indicates the consequence—the turning out or resulting from the premisses.

§ 481. Term, syllogistically considered, is the notion into which a proposition is resolved as predicate, or that of which there is predication.—(*An. Pr.*, i. 1.) Term (ὅρος, *terminus*), as predicate, is thus the limiting or determining notion. The subject and predicate of a proposition are the terms or limits by which it is circumscribed, as lines do a figure.² To determine is thus properly to limit or circumscribe a subject by means of a predicate. The determination lies in the limit implied in the predicate notion or term, whether this be an analysis of the subject notion, or an attribute added to it, or the reference of it to a class. This limit is realised through the

¹ Cf. Trendelenburg, *El. Log. Arist.* § 20.

² Cf. Trendelenburg, § 22.

opposition of its negation—in quality or in quantity merely, or in both.

§ 482. Apart from the middle, the other terms are called *the extremes* (ἄκρα), for the one occupies the highest place, so that it embraces the other notions as subjects; the other the lowest place, so that it is subject to the others. Hence, the one of the extremes which is wider is called the *major term*—that which is narrow, the *minor term*. The major is predicate, the minor subject of the conclusion.¹

(a) The different constituents of the Syllogism are named as follows, viz. :—

(1.) The middle notion or term is called *medium, terminus medius, nota intermedia, argumentum*, τὸ μέσον, ὁρος μέσος.

(2.) The given judgments or premisses are called *propositiones premissae, judicia premissa, posita, προτάσεις, τὰ προτεινόμενα, τὰ τεθέντα, τὰ κείμενα, sumptiones, acceptiones, λήμματα*.

(3.) The minor premiss, or that which contains the subject or subordinate propositional member of the conclusion, is called *propositio minor, assumptio, subsumptio, πρόσληψις, πρότασις ἡ ἐλάττω*.

(4.) The major premiss, as containing the superordinate propositional member of the conclusion, is called *propositio major, propositio, sumptio, λήμμα, τὸ μείζον*.

(5.) The conclusion is called *conclusio, judicium conclusum, illatio, συμπερασμα, ἐπιφορά*.—(See Hamilton, *Logic*, iii. L. xv. ; and Ueberweg, *Logic*, p. 335.)

§ 483. The major term is thus the greatest whole in the reasoning; the minor is the least; the middle the less. In the following example, the major term is *organised*; the minor or least is *crocus*; the middle or less is *plant*. The major proposition is that which states the relation of the greatest quantity to the less,—

Every plant is organised.

The minor proposition is that which states the relation of the least quantity to the less,—

The crocus is a plant.

The conclusion is that which states the relation of the least quantity to the greatest,—

The crocus is organised.

Aristotle, in speaking of *major, minor, and middle terms*, had reference to the first figure, in which these terms may be taken as relatively wider, middle, and narrower or less. But this distinction does not properly hold in the other figures,

¹ Trendelenburg, *El. Log.* § 24.

and in the Unfigured or Expository Syllogism does not hold at all.

§ 484. The usual logical tests of the major and minor terms in a reasoning are obviously of a wholly superficial nature. The main one is really the relative local position of the terms. Hamilton goes deeper, seeks a scientific ground, and founds the distinction on the two counter-quantities of Breadth and Depth—Extension and Comprehension. That is major in Breadth which contains the part of the class—the minor is the part contained. That is major in Depth which contains the attribute, and the minor is the attribute contained. And when these terms are translated the one into the other, the major of the one quantity becomes the minor of the other. Further, there is formally or logically no major or minor term or premiss in the Unfigured Syllogism, or in the second or third figures of the Figured Syllogism. In these forms the extremes are either in no quantity or in the same. The distinction holds only in the first figure; and here either extreme may be major or minor, according as we take it in Breadth or Depth.

§ 485. In his final doctrine of Syllogism, Hamilton distinguishes two ways of stating a categorical reasoning—viz., the Synthetic and the Analytic. In the former, which is the more common, we proceed from the premisses to the conclusion; though, as the reasoning is mentally one, premisses and conclusions are inappropriate expressions. In the latter way—the analytic—we first state the conclusion, and then state the premisses as the reasons. Here the conclusion would properly be called the *Question* or *Quæsitum*, and the premisses the *proofs*. The analytic method Hamilton regards as the more natural. We are in doubt, and we put the question, *Is C in A?* Analytically we reply, *Yes* (or *C is in A*); for *C is in B*, and *B is in A*.

This is more natural than the synthetical order, which would be:—

B is in A, and C is in B, therefore C is in A.

Or analytically:—

*Is spirit of salt a poison? Yes;
For spirit of salt is a mineral acid,
And all mineral acid is a poison.*

Synthetically:—

*All the mineral acids are poison ;
 Spirit of salt is a mineral acid ;
 Therefore it is a poison.*

The expression of the Syllogism in either of these ways shows that it is originally one in thought ; and the Analytic or Synthetic form, as the case may be, follows the needs of expression. It might be added to this that while the analytic mode is that which we should naturally adopt for research, the synthetic is better fitted for teaching or exposition.

§ 486. As Hamilton has observed, the analytical order of the Syllogism thoroughly disposes of the common but superficial objection that the Syllogism is a *petitio principii*. This, which has been urged by Mill and others, is that the truth of the conclusion must be known before the truth of the major premiss which states the general rule. Before I am able to say *all men are mortal*, I must know that *Socrates is mortal*,—I must know that every individual man, including Socrates, is mortal. Otherwise I could not state the general principle or rule. But if I know that Socrates is mortal, there is nothing to be inferred from the general—*all men are mortal*.

This objection is beside the point in even the Synthetic reasoning, but its irrelevancy is clearly shown by the Analytic form. I am in doubt, and ask—*Is man a responsible agent ?* I reason thus :—

*Man is a responsible agent ;
 For man is a free-intelligent agent ;
 (And all free-intelligent agents are responsible.)*

In what way is there any begging of the question asked here ? I compare *man* with the class *free-intelligent agent*, and I therefore determine the question of his responsibility. But my real difficulty here is to know whether *man* is to be classed with *free-intelligent*. The moment I know that, I know that he is responsible. The general rule that *free-intelligent* is responsible did not involve the truth to me that *man* was responsible, because I might quite well know that, and yet not know that *man* was a *free-intelligent*. My ultimate appeal is no doubt to the rule ; but that which decides the question, or quæsitum, of the reasoning is the ascertaining that the rule is capable of being applied to the case

in hand,—that in fact the case in hand can be subsumed under it. The analytic mode of reasoning is thus the type of the method of search and inquiry; it is that naturally followed by one as yet ignorant of the truth of the conclusion. The synthetic, on the other hand, is that adopted when one knows the truth of the conclusion already, and is called upon to teach or expound it through its grounds. These,—the premisses,—are then placed first. To the teacher thus the conclusion is known; to the learner it is not, or only when both premisses are unfolded. The Analytic method is for the learner; the Synthetic for the teacher.

§ 487. Or to take an illustration in practice—*Ought this man to be punished or not for an offence which he has committed?* How is this question to be decided—yea or nay? Only by considering whether it would be just or expedient that the offence committed in the given circumstances should have the usual punishment, or whether there are mitigating circumstances which might render it just or expedient to allow the actor to go. Suppose the crime were classed under the former, or the latter head, we should simply be referring it to a general law or rule—in fact, a major premiss. This in no way contained it from the first or beforehand,—the rule was not generalised from it, but it, a new case with resembling features, is subsumed under the rule. It would be an inaccurate account of such a process to say that it is simply a reading out of a general law or induction which I have before me, of a decision already come to, for the case is a wholly new one. And it would be quite as inaccurate and inadequate to say that I have only to generalise the conclusion, and say all such crimes ought to be punished, or any such crime ought not to be punished, since this is the very question which I must decide ere I reach the conclusion at all,—which of these general alternatives, in fact, I must proceed upon in determining the conclusion itself.¹

§ 488. On this point one other remark may be made. The objection urged by Mill and others to the syllogism as a *petitio principii* is shown to be futile even as regards the Synthetic form, the moment it is shown that every general rule or major proposition of a reasoning is not got by

¹ Cf. Janet, *Rev. Phil.*, 1881, t. 12, p. 117.

induction. The objection, to have any weight, requires this to be established,—that every general rule or universal principle at the head of a reasoning is a simple generalisation, or product of induction,—nay, it even requires the rule to be the result of the inspection of every individual, actual and possible, under it. This is ridiculous, even as an account of the inductive process. But if it be not shown that we have no universal *a priori* truths, the objection to synthetic syllogistic reasoning is futile. If we have such, and one principle is enough, the moment it is applied to an existence under it, be it actual or possible, that moment is the allegation of the *petitio principii* in the reasoning disproved. If it be true *a priori* that every event which takes place has a cause, then the subsumption of any particular event under the rule annihilates the whole of this criticism.¹

¹ For a very able and complete exposure of the fallacies in the theory of the Syllogism as a reasoning from particular to particular, see Janet, *De la Valeur du Syllogisme Rev. Phil.*, tome 12, p. 105 (1881).

CHAPTER XXX.

CATEGORICAL SYLLOGISMS—ON ARISTOTELIC PRINCIPLES—
MOOD AND FIGURE.

§ 489. Syllogism as a combination of propositions must be stated in the forms and relations of those propositions. The number of syllogistic forms must, therefore, be limited by the number of propositions, and their possible combinations. This, in the first place, is quite independent of Figure, or the position of the middle term with reference to the extremes. But, as will appear, the validity of the possible moods will be limited or determined by the general rules of reasoning, and the special rules applicable to Syllogistic Figure. If Mood in the end be emancipated wholly from Figure, then we shall have moods determined only by the general syllogistic rules or conditions of reasoning.

§ 490. The mood of a syllogism (*modus, τρόπος*) represents the nature of the combination of the premisses, or of the premisses and conclusion, according to quantity and quality. The early logicians regard Mood as composed of two propositions only,—the major and minor premiss. In this case there would be but sixteen moods. If, however, we extend mood to the conclusion, the three propositions of the Syllogism, taken along with the four Aristotelic kinds of proposition,—A, E, I, O,—would give us sixteen pairs of premisses and four different conclusions,—in all sixty-four moods.

The sixteen pairs of premisses are as follows :—

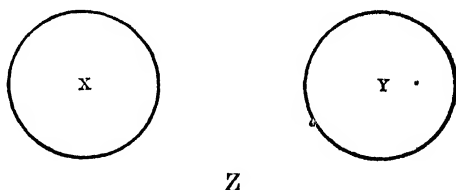
A A	E A	I A	O A
A E	E E	I E	O E
A I	E I	I I	O I
A O	E O	I O	O O

The combinations now spoken of are wholly numerical; their logical validity remains to be tested by the general rules of Syllogism, and by the special rules of each Figure.

§ 491. The essence of the Categorical Syllogism being that there are three terms, and one of them common, the rules of valid syllogistic inference follow from the application of the Laws of Identity and Non-Contradiction to the construction of the Syllogism itself, or to its form. These are—(1.) *No inference follows from two negative premisses*, for the community of the middle term with the extremes is thus excluded. There is no means of mediation, no ground of comparison, and therefore no ground of inclusion or exclusion in the conclusion. There is no constitution of the relation of whole and part. Thus—

No Y is (any) X.

No Z is (any) Y.



The possibilities here are either (1) *No Z is any X*; or (2) *Some Z is X*; or (3) *All Z is X*. But nothing is determined. So equally with negative premisses, universal and particular, and both particular. Hence the moods EE, EO, OE, OO are logically inadmissible.

§ 492. (2.) The second rule of exclusion applicable to all the figures follows on the same principle—viz., that *there is no valid conclusion from two particular premisses; ex meris particularibus nihil sequitur*. The general ground of this rule is that no community of the middle term with the extremes—major and minor—is laid down. The part of the one proposition is not necessarily identical with the part of the other. If, for example, it is said:—

Some Y is X,

Some Z is Y;

Or,

*Some men are negroes,
Some Africans are men.*

I am not told whether the *some Y (men)* who are negroes in the major are the same or not with the *some men* who are Africans in the minor. So long as this doubt remains, inference is paralysed. The same principle applies whether the premisses be particular affirmative and particular negative, or both particular negatives.

The moods inadmissible on this rule are obviously—
II, IO, OI.

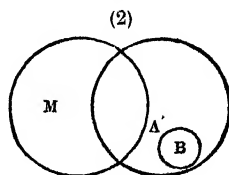
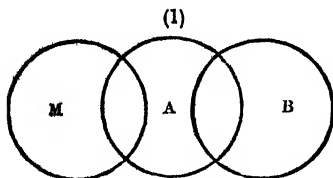
(α) In all Syllogisms, according to Aristotle, it is necessary that some term be affirmative and universal. Without a universal there will either be no syllogism, or it will not relate to the point proposed, or what is sought from the commencement will be begged. Thus,—Is the pleasure of learning honourable? If it be said pleasure is honourable, not adding all, there will be no conclusion. If only some pleasure be understood, either another pleasure may be posited, which is nothing to the point, or the pleasure of learning itself, in which case we beg and accept that which was to be demonstrated from the first.—(*An. Pr.*, i. 24.) (Thus—

*Some pleasure is honourable ;
Learning brings pleasure ;
∴ The pleasure of learning is honourable.)*

§ 493. (3.) There is given as a third general rule of exclusion that no valid conclusion follows from a particular major premiss combined with a negative minor premiss. Thus—

*Some A is (some) M,
No B is (any) M,*

it does not follow either that *some B is not any A*, for all *B* may not be quite separated from all *A* ; and thus some of *B* may be *A*, or even all *B* may be included in *A* as a part, although some other part of *A* is included in *M*. Thus—



In other words, there is no conclusion in the form B A.¹ According to this view, the mood I E is specially excluded in all the figures, and I O, O E, O O; these, however, fall to be excluded on other grounds as well. This leaves only eight forms of combination of the premisses. I confess I do not see that there is proper ground for the exclusion of I E. It is made to depend on a certain arbitrary distinction of majority and minority in the premisses which does not necessarily exist, especially in the second and third figures. With the premisses I and E,

Some A is (some) M,
No B is (any) M,

it follows, even on Aristotelic principles, that *some A (at least) —namely, that which is M, is not any B*. And there follows also a conclusion in terms of B A, on the full scheme of propositional forms; for we can infer *some B is not (some) A*, and convert *some A is not (some) B*.

(A) (M)
Some organised is some animal,

(B) (M)
*No plant is any animal,**

(A) (B)
Some organised is not any plant,

(B) (A)
but not Some plant is not any organised.

§ 494. Supposing always the Syllogism to be simple, or to include three terms and three propositions, we have (1.) *The middle term must be distributed—that is, taken in its full extent or quantity, once at least in the premisses.*

(2.) *No term may be distributed—that is, taken at its full quantity in the conclusion, which was not distributed in one of the premisses; or no term may be taken in the conclusion at more than the greatest quantity assigned to it in the premisses.* The violation of this rule results in an illicit process of major or minor term.

(3.) *If one premiss be negative, the conclusion must be negative.*

(4.) *If one premiss be particular, the conclusion must be particular.*

¹ Ueberweg, *Logic*, p. 388.

§ 495. Of the eight generally admissible combinations, some are to be rejected in certain of the figures, and others are useless, as marking only a particular conclusion when a universal could be drawn, as A A I in the first figure. The application of the general and special rules leaves nineteen moods both valid and useful. We have thus now to explain what is meant by the Figure of Syllogism.

§ 496. Categorical Syllogisms are divided, according to the position of the Middle Term, into several forms, known as Figures (*figuræ*, *σχήματα*). The position of the Middle Term depends on its relation as subject or predicate of the other two terms. (1.) If the Middle Term be subject in one premiss and predicate in another, we have the First Figure; (2.) if it be predicate in both premisses, we have the Second Figure; (3.) if it be subject in both premisses, we have the Third Figure. As Aristotle has put it: the Middle Term must be in both propositions. If, therefore, the middle is attributed to another term, or another attributed to it, or if it is affirmed of one term and another is denied of it, this is the First Figure. If it is itself affirmed and denied of some term, this is the Middle Figure. If the other terms are attributed to it, or if one be denied and the other affirmed of it, this is the Last Figure. Thus we have the position which the middle occupies in each figure.¹ Let Y be middle, X major, Z minor, we have—

I. Figure—Y Δ

Z Y

\therefore Z X

II. Figure—X Y

Z Y

\therefore Z X

III. Figure—Y X

Y Z

\therefore Z Y

§ 497. The statement of the Middle Term, as in the First Figure subject and predicate, may be regarded as enabling us to include the First Figure Proper, and what is known as the Fourth Figure. In the one case, the middle is subject to

¹ *An. Pr.*, i. 32, § 7.

the major and predicate to the minor ; in the other case, it is predicate to the major and subject to the minor.

IV. Fourth or Second Form of First Figure :—

X Y
Y Z
∴ Z X

§ 498. In the Second and Third Figures, the middle term preserves the same relation to each of the other two terms in both premisses,—in the one subject, in the other predicate.

§ 499. The First Figure is regarded by Aristotle as the perfect one, or as giving the perfect moods. It gives the order of subordination from the highest or most general to the lowest or most special—the major or next general term being in the conclusion predicated of the minor.

Thus—

*All mammals are viviparous,
All whales are mammals,
Therefore all whales are viviparous.*

In other words, *mammals are under (a species of) viviparous.*

*Whales are under (a species of) mammals,
Therefore whales are under (a species of) viviparous.*

§ 500. “When three terms,” says Aristotle, “are so related, that the extreme (major) is in the whole middle, and the middle, again, is or is not in the whole first (minor), there is necessarily a perfect conclusion (syllogism) of the extremes.

“I call that term the middle which is both itself in another and another in it—which is thus middle by position ; the extremes both the term which is in another and that in which another is.

“For if A is enunciated of every B, and B of every C, A must be enunciated of every C. I call this the First Figure.”¹

(B) (A)
Every plant is organised,
(C) (B)
Every crocus is a plant,
(C) (A)
Every crocus is organised.

¹ *An. Pr.*, i. 4, § 2, 3, 4.

Here A the major term is in the whole B, the middle; and B the middle, is in the whole C, the minor; therefore the whole C, the minor, is in (some at least) A, the major.

This formula may fairly be taken as fitted and probably intended to embrace reasoning, both in Comprehension and Extension.

In Extension—

All B is some part of the class A,

All C is some part of the class B,

\therefore *All C is some part of the class A.*

In Comprehension—

The whole B contains the mark A,

The whole C contains the mark B,

\therefore *The whole C contains the mark A.*

Or—

The whole C contains the mark B,

The whole B contains the mark A,

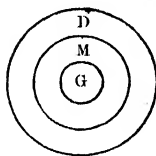
\therefore *The whole C contains the mark A.*

(3) (M) (1)
Take—gold, metal, ductile—

(M) (1)
(All) metal is ductile.

(3) (M)
(All) gold is metal.

(3) (1)
Therefore gold is ductile.



The third is subject to or contained under the middle; the middle is subject to or contained under the first; the first is necessarily predicated of, or contained under, the third. This is the relation of subsumption.¹

(a) σχῆμα πρῶτον—from material figure and form—hence applied to diction and the categories. The Latins translated σχῆμα by *figura*. —(Trendelenburg, *El. Log.*, § 24.)

A B Γ with Aristotle always indicates the first figure.

(b) Aristotle, looking only to the essential relations of the terms, usually put the predicate first. Thus—

If A can be predicated of all B,

And B of all Γ,

Then A is to be predicated of all Γ.

¹ Cf. Trendelenburg, *El. Log.*, § 24.

That is—

All B is A,
All F is B,
Then all F is A.

§ 501. Aristotle thus distinguishes complete or perfect and incomplete or imperfect Syllogism. Syllogism is complete when there is no need of any other datum than the data previously admitted, in order that the necessary proposition may, as conclusion, appear in all its evidence. It is incomplete when there is needed one or more other data, which may be necessary after the terms first posited, but which have not yet been precisely formulated in the premisses.

The complete syllogism is in this view that afforded by the moods of the First Figure, and those only. The moods of the Second and Third Figure are incomplete, inasmuch as, in order to evince their perfect cogency, the propositions, one or more, need conversion, through which they are brought back to moods in the first figure.¹

§ 502. The formula of the Second Figure with Aristotle is exemplified as follows:—

Let M be enunciated of no N and of every X. Because, therefore, the negative proposition is convertible, in no M will there be N; but M was placed in every X; therefore N will be in no X. Thus—

$$\left. \begin{array}{l} \text{No } N \text{ is } M = E \\ \text{Every } X \text{ is } M = A \\ \therefore \text{No } X \text{ is } N = E \end{array} \right\} = \text{Cesare.}$$

With the conversion:—

$$\left. \begin{array}{l} \text{No } M \text{ is } N = E \\ \text{Every } X \text{ is } M = A \\ \therefore \text{No } X \text{ is } N = E \end{array} \right\} = \text{Celarent.}$$

So of the other moods.

In this figure there is no affirmative syllogism, but all negative, either universally or particularly.²

The middle is posited beyond the extremes, and indeed in the first place. The middle term is predicate in both premisses.

§ 503. In the Third Figure we have:—

¹ *An. Pr.*, i. 1.

² *An. Pr.*, i. v.

$$\begin{aligned}
 (a) \quad & \left. \begin{array}{l} \text{All } Y \text{ is } X \\ \text{All } Y \text{ is } Z \\ \therefore \text{Some } Z \text{ is } X \end{array} \right\} = \text{Darapti.} \\
 (b) \quad & \left. \begin{array}{l} \text{No } Y \text{ is } X \\ \text{All } Y \text{ is } Z \\ \therefore \text{Some } Z \text{ is not } X \end{array} \right\} = \text{Felapton.}
 \end{aligned}$$

When one term, says Aristotle, is in all, but another term in none, of the same term, or when both terms are or are not universally in this same term, I call this the Third Figure; the middle in this I call that notion to which both are referred as predicates, and the extremes the predicates; the major extreme is that furthest removed from the middle, the minor that which is nearest it; but the middle is thus placed beyond the extremes, that it may occupy the last place. The conclusion is valid, whether the terms are universally or not referred to the middle notion.

When P and R are in all S (as subject), then necessarily P is in some R (as part). Thus—

$$\left. \begin{array}{l} \text{All } S \text{ is } P \\ \text{All } S \text{ is } R \\ \therefore \text{Some } R \text{ is } P \end{array} \right\} = \text{Darapti.}$$

By conversion, since *all S is R*, *some R is S*. Then *all S is P*, *some R is S* (as predicate), therefore *some R is P*. This is *Darii* of the First Figure.

There is no universal conclusion in this figure, either affirmative or negative.¹

§ 504. Aristotle did not recognise the Fourth or (so-called) Galenic Figure as distinct; but he has indicated some moods which were afterwards referred to it.² Theophrastus and Endemus, according to the testimony of Alexander of Aphrodisias and Boethius, added five new moods—that is, what are known as indirect moods of the First Figure. These are *Bamalip*, *Calemes*, *Dimatis*, *Fesapo*, *Fresison*. These at first given as indirect or imperfect moods of the First Figure, got through conversion, were constituted into moods of a new or Fourth Figure.³ The attribution of the Fourth Figure to Galen as his creation has not been proved. It

¹ *An. Pr.*, i. 6.

² *Ibid.* i. c. vii.

³ Cf. Ueberweg, *Logik*, p. 368.

rests mainly on a statement of Averroës; and what of Galen's writings remain show no proof of his authorship. But the truth is, that the moods of the Fourth Figure were recognised long before his time, and all that he could have done was to call them moods of a new or Fourth Figure. The moods *Fapesmo* and *Frisismo* are also regarded as indirect moods of the First Figure.

(a) The form of syllogism with Aristotle depends, according to Trendelenburg, on the different relations of the terms, grounded on the principle of the wider containing the narrower. Hence there are but three positions: (1.) When the middle term is in the middle position, as in the first figure; (2.) when it is highest, as in the second figure—that is, predicate in both premisses; (3.) when it is lowest, as in the third figure—that is, subject in both premisses. With three terms in the syllogism, and the relations of the middle, these are properly all the figures.

The so-called Fourth Figure does not depend on any new necessary relation of the terms, but on the fortuitous position of these in the premisses. This is quite a different principle of division, and really arbitrary. Further, there is nothing in the arrangement of the Fourth Figure which can yield a conclusion different from what can be reached in the others. It is, therefore, unnecessary and useless. It is simply not a new figure but a variation of arrangement, founded on the possible place of the middle term in the premisses.—(Trendelenburg, *El. Log. Arist.*, § 28.) On Trendelenburg's view in relation to Aristotle, see Ueberweg, *Logic*, p. 358. On the difference between Hegel's view of the figures and that of Aristotle, see Trendelenburg, *Logische Untersuchungen*, iv. p. 251.

(b) Against Kant's conclusion in *The False Subtlety of the Four Syllogistic Figures* (1762), Ueberweg urges that the conclusion in the other figures besides the first may be directly found without reduction to the first. They are simple, as much as the first.—(*Logic*, p. 373.)

(c) Hegel places the third figure before the second, or rather names the third second, and the second third. The change, if it be not a historical blunder, has no ground in reason.

(d) Herbart and Drobisch reject the moods of the Fourth Figure. Trendelenburg rejects those of the third, on the ground of ambiguity and tendency to error. But this is excluded by a strict determination of the nature of particular judgment.—(Ueberweg, *Logic*, p. 375.)

(e) Hamilton's view of the Fourth Figure is, that it is a hybrid reasoning. Its two premisses run in one quantity—Comprehension; its conclusion is in another—Extension. Further, the conclusion is indirect or mediate, being the converse of what is natural. The Fourth Figure is really the First, with premisses transposed, and the indirect conclusion of the First given as a direct conclusion.—(See *Logic*, iv., *App. D. (a)*, p. 449.)

Thus *Bamalip* is only *Barbara*, with transposed premisses and converted conclusion:—

- (2.) *All irons are some metals,*
 (1.) *All metals are some minerals,*
All irons are some minerals.

(By conversion)

∴ *Some minerals are all irons.* And so of the others.

(f) Ueberweg seems to suppose that the spherical representation may equally symbolise Extension and Comprehension.—(*Logic*, p. 379.) In this he is wrong. Of course whether Extension and Comprehension can be united in the same reasoning, as Trendelenburg supposes, is a different question. If Ueberweg further supposes, as he seems to do, that the representation by spheres of propositions and syllogistic moods really proves anything regarding their congruence or confliction, he is equally mistaken. Diagrams only show—only can show—what is valid on a law of thought. Picturing to the eye by diagram is nothing more than individualising, and this is only the shadow of proof. The truth is, seeing that the concept is essentially unpicturable, spherical diagrams are inadequate as representations, and only rude aids to thinking.

§ 505. In consequence of the application of the rules already specified:—

In the First Figure the moods are—

AAA, EAE, AII, EIO.

In the Second—

EAE, AEE, EIO, AOO.

In the Third—

AAI, IAI, AII, EAO, OAO, EIO.

In the Fourth, or Indirect Moods of the First—

AAI, AEE, IAI, EAO, EIO.

§ 506. These are summed up in the mnemonic lines:—

- (1.) *bArbArA, cElArEnt, dArII, fErIoque* prioris.
- (2.) *cEsArE, cAmEstrEs, fEstInO, bArOkO*, secundæ.
- (3.) *Tertia, dArAptI, dIsAmIs, dAtIsI, fElAptOn, bOkArDO, fErIso*, habet: quarta insuper addit.
- (4.) *brAmAntIp, cAmEnEs, dImArIs*,¹ *fEsApO, frEsIsOn*.

§ 507. The first mood of the First Figure, Barbara, is in letters:—

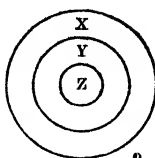
All Y is X.

All Z is Y.

All Z is X.

¹ Otherwise, *bAmAlIp, cAlEmEs, dImAtIs*.

Symbolically (in extension):—



*All animal is sentient,
All man is animal,
Therefore all man is sentient.*

§ 508. In the Second Figure we have the mood Cesare.
This is in letters:—

*No X is Y.
All Z is Y.
∴ No Z is X.*

Symbolically (in extension):—

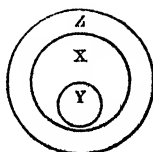


*Anything lasting is not violent,
Every unjust law is violent,
Therefore any unjust law is not lasting.*

§ 509. In the Third Figure the mood Darapti is in letters:—

*All Y is X.
All Y is Z.
∴ Some Z is X.*

Symbolically (in extension):—



*All temperance is a virtue,
All temperance is praiseworthy,
Therefore some virtue is praiseworthy.*

(a) There is a sharp controversy in regard to the original authorship of these and other of the logical mnemonic lines. Prantl and others attribute them to Michael Psellus (the second); while Hamilton, Thurot, and Val Rose, hold that the author of the *Synopsis*, which has passed under the name of Psellus since 1597, was the borrower. Psellus was born in 1018 or 1020, and he died after 1077. He was the author of a paraphrase of the *De Interpretatione*, published at Venice in 1503, and of a *Σύνοψις τῶν πέντε φωνῶν καὶ τῶν δέκα κατηγοριῶν*, published at Venice, 1532. In 1597, Ehinger edited a MS. entitled *Σύνοψις εἰς τὴν Ἀριστοτέλους λογικὴν Ἐπιστήμην*. This MS. was without name of author; but Ehinger attributed it to Psellus. The *Synopsis* is almost identical with a work which was undoubtedly by Petrus Hispanus (1226-1277), entitled *Summulae*, and consisting of Seven *Tractatus*,—printed in 1486,—of which some forty-seven editions, mostly with commentaries, appeared between this date and 1516. The authenticity and authorship of the *Synopsis*, attributed to Psellus, are disputed, on the following, among other grounds—(1.) That there is no authority from any designation in the MS. used by Ehinger to assign the authorship to Psellus; (2.) that there are other MSS. in existence in Europe, identical with the Ehinger one, in which the treatise professes to be merely a translation from Hispanus; (3.) that in four out of these five (or more MSS.), the name of the author or translator is given as Georgius Scholaris, known as Gertradius and Patriarch of Constantinople in 1453; (4.) that though the *Synopsis* contains Greek equivalents for the Latin memorial verses, those for the Syllogistic moods are greatly inferior in precision and suitableness, as compared with the lines appearing in the *Summulae* of Hispanus. To the reasons now adduced might with probability be added the presumption that Hispanus, living at the period he did, was not Greek scholar enough to be able to translate the work of Psellus. It is thus inferred that, instead of the *Synopsis* of Psellus being the original work, this was merely a translation, by a later hand, from the *Summulae* of Hispanus. In this case the memorial verses are to be assigned to Hispanus as the original, relatively, and not to Psellus.

But it would be a hasty inference to assign the lines—whether of the Syllogistic moods or others—to Hispanus as absolutely the original source among the Latins. These, or very close equivalents, had been in circulation before the time of Hispanus himself. They occur in the writings (unpublished) of William of Shyrewood (or Shyrwode), who died Chancellor of Lincoln in, it is said, 1249. There is evidence, however, that he was alive considerably after this date. Shyrewood was a very distinguished logician,—of whom Roger Bacon says: “longe sapientior Alberto, nam in philosophia communi nullus major est eo.” His treatise anticipated the terminalist doctrines of Hispanus. From Shyrewood, the verses seem to have passed to a pupil of his,—Lambert of Auxerre,—who lived in the middle of the thirteenth cen-

tury. Through one or both of those sources the mnemonics passed to Hispanus, whose versions show some slight deviations from those of his predecessors.—(Cf. Prantl, ii. p. 275; Thurot, *Revue Archéologique*, October 1864; *Revue Critique*, March 30, and July 6, 1867; Hamilton, *Discussions*, pp. 128, 671.)

Shyrewood gives:—

Sub Præ Prima, bis Præ Secunda, tertia bis Sub.

He gives also for the first time in Latin (? first absolutely):—

Barbara, Celarent, Darii, Ferio, Baralip-ton,
Celantes, Dabitis, Fapesmo, Frisesomorum,
Cesare, Campestres, Festino, Boroco, Darapti,
Felapton, Disamis, Datisi, Bocardo, Ferison.

Shyrewood adds: A signifies universal affirmative; E universal negative; I particular affirmative, O particular negative; S simple conversion; P per accidens; M transposition of premisses; B and R in the same phrase *reductio ad impossibile*.

The two first verses serve the first figure, the four terms of the third verse the second figure, and all the others the third figure. To the first four moods of the first figure all the others are reducible.

Prantl conjectures that A, E, I, O, are due respectively to the vowels in πᾶς, τίς, οὐδείς (οὐδέν), οὐ πᾶς (ii. p. 277). But these vowels appear to be rather of Latin origin. A and I may very well be supposed to represent the two first vowels in *Affirmo*, and E and O the two in *Nego*.

§ 510. The special rules of the First Figure are—(1.) *that the major premiss must be universal*; (2.) *that the minor premiss must be affirmative*.

§ 511. The special rules of the Second Figure—are (1.) *the major premiss must be universal*; (2.) *one of the premisses must be negative*.

(a) In the second figure, the middle term is the predicate alike of Proposition and Assumption. As predicate it is taken as the wider or more general notion in each premiss,—the subject being regarded as part of the genus. Thus—

*Whatever lives is nourished,
No stone is nourished,
Therefore no stone lives.*

Hence both premisses must be universal, one affirmative and the other negative, or one at least universal, whether it affirm or deny. From mere particulars nothing follows.

In the second figure there is no affirmative conclusion according to Aristotle; for in order to this, both proposition and assumption would require to be affirmative: and as the middle term is predicate in both, and is necessarily taken only particularly, there would not necessarily be a comparison of the extremes with a common third. If both premisses be negative, there is no positive relation of either with the

middle term, but mere exclusion.—(Cf. Trendelenburg, *El. Log. Arist.*, § 25.)

§ 512. The special rule of the Third Figure is *that the minor premiss must be affirmative.*

(a) In the third figure, the middle term is subject alike of proposition and assumption. Hence it is regarded as less general than either of the other terms. Thus—

S P
Every square has right angles,

S R
Every square is a parallelogram,

R P
∴ There are parallelograms which have right angles.

In the third figure there is no universal conclusion. P as predicate is conjoined with R in the conclusion; and P and R are predicates of the same subject. Since the predicate commonly is wider than the subject, P and R are wider than the same subject. Because, therefore, P and R either agree or disagree with the narrower (the middle), you cannot infer that P and R universally agree or disagree with each other. There is reference only to a part of both. Wherefore, in the third figure there is no universal conclusion; and there is no conclusion from mere negatives.—(Trendelenburg, *El. Log. Arist.*, § 26.)

Lambert has for rule of first figure the *dictum de Omni et de Nullo*; for the second, a *dictum de Diverso*, “things which are different do not belong to each other;” for the third, a *dictum de Exemplo*, “if As are Bs, then there are As which are Bs;” for the fourth, a *dictum de Reciproco*; “if no M is B, no B is this or that M; if C is or is not this or that B, there is B which is or is not C.”

The first figure proves qualities, the second differences, the third examples and conceptions, the fourth reciprocities.—(Cf. Ueberweg, *Logic*, pp. 372, 373.)

§ 513. It follows from these rules that in all the figures the conclusion can be (1.) *affirmative* only, if both premisses are *affirmative*; (2.) *negative*, if one premiss be *negative*; (3.) sometimes *universal*, if both premisses are *universal*, sometimes *particular*, if both premisses are *universal*; (4.) *particular* if one premiss is *particular*.

§ 514. It appears also that every kind of proposition—viz., A, E, I, O, may be proved in the first figure. There can be proved in the second, negatives only—viz., E, O; in the third, particulars only—viz., I, O; in the fourth, particular affirmative, universal negative, and particular negative—viz., I, E, O.

§ 515. *Universal affirmative* conclusions have the highest scientific value, because they advance our knowledge in a positive manner, and admit of reliable application to the individual. The *universal negatives* come next; they guarantee not only a negative, but a distinctly definite view. Then come the *particular affirmatives*, which promise a positive advance, but leave us helpless in the application to individual cases. Lastly, the *particular negative* conclusions are of the lowest value. Their special service is to ward off false generalisation.¹

(a) Science which embraces the nature of the thing, can be neither negative nor particular. It shows the genesis of the thing, and lays down its nature. Negation merely takes away, and the particular does not embrace knowledge extending to all of the class. As the second figure is negative, the third particular, it is only the first which can contain science.

Τῶν δὲ σχημάτων ἐπιστημονικὴν μάλιστα τὸ πρῶτόν ἐστιν. αἱ τε γὰρ μαθηματικαὶ τῶν ἐπιστημῶν διὰ τούτου φέρουσι τὰς ἀποδείξεις ὅλον ἀριθμητικὴν καὶ γεωμετρικὴν καὶ ὀπτική.— (*An. Post*, i. 14.)

§ 516. Reduction in the Aristotelic sense, means the bringing back of a mood of the Second and Third Figures, and latterly of the Fourth, to one of the First Figure — as perfect. The means of doing this are two: (1.) Conversion of the premisses or conclusion; (2.) Transposition of the premisses. To this may be added Contraposition. We thus can get from the given premisses either the original conclusion, all in the First Figure, or a conclusion from which the original conclusion follows by conversion. In the mnemonic lines those means of reduction are marked by the letters *s*, *m*, *p*. These, in their order, mark simple conversion, transposition of the premisses, conversion *per accidens*. The initial consonant of the mood of the figures after the first indicates the mood of the first to which the mood in question is to be reduced. Thus *Cesare* of the Second Figure is to be reduced, as indicated, to *Celarent* of the First.

Cesare :—

No *X* is *Y*,
All *Z* is *Y*,
∴ No *Z* is *X*.

¹ Ueberwäg, *Logic*, p. 437.

*No plant feels,
Every animal feels,
So Therefore no animal is a plant.*

Celarent :—

*No Y is X,
All Z is Y,
∴ No Z is X.*

*Nothing that feels is a plant,
Every animal feels,
Therefore no animal is a plant.*

In the Second Figure—Camestres :—

*Every animal lives,
No stone lives,
Therefore no stone is an animal.*

This is converted into Celarent thus :—

*Nothing living is a stone,
Every animal lives,
Therefore no animal is a stone,
Therefore no stone is an animal.*

So Darapti :—

*All Y is X,
All Y is Z,
∴ Some Z is X.*

This is reduced to Darii :—

*All Y is X,
Some Z is Y,
∴ Some Z is X.*

And so with the others, according to indication—affording a good enough exercise for beginners in logic.

Here we have employed Conversion and transposition of the premisses. This is known as Ostensive Reduction.

§ 517. *Reductio or Deductio ad Impossibile* is that in which from the contradictory of the conclusion to be proved, and another proposition manifestly true, or at least conceded by an opponent, we infer the absurd or impossible. If in a mood of the Second and Third Figures the premisses are conceded, but the conclusion denied, as not necessarily following from the premisses, the contention may be reduced to absurdity by the syllogism being reconstituted in the First Figure, one of the premisses being preserved and the con-

contradictory of the conclusion put in the place of the other. In the Second Figure, the major is preserved, and the contradictory of the conclusion put in place of the minor; in the Third Figure, the minor is preserved, and the contradictory of the conclusion is put in place of the major:—

Servat majorem, variatque secunda minorem;
*Tertia majorem variat, servatque minorem.*¹

. Thus, *Baroko*:—

All X is Y;
Some Z is not Y;
Some Z is not X.

Every animal feels;
Some living thing does not feel;
Therefore, some living thing is not animal.

Reduced to *Barbara*:—

All X is Y (conceded);
All Z is X;
∴ All Z is Y;
Every animal feels;
*Every living is animal;**
Therefore, every living feels.

As this conclusion is the contradictory of the original (given) Minor Premiss, it must be false; one of the premisses must, therefore, be false. But the original major as given is (supposed) true. The falsity is thus in the minor. This is the contradictory of the original conclusion; therefore, the original conclusion is true.²

The K in *Baroko* and *Bokardo* means that the premiss indicated by the vowel before it is to have the contradictory of the conclusion put in its place. In the one case, this is the major premiss; in the other, the minor.

But the whole of reduction is simply unnecessary; the moods of the Second and Third Figures are on any system equally and as directly valid as those of the First. The superiority of the First Figure over the others lies not in a higher cogency or necessity of sequence, but in greater perspicuity in respect of the principle of inference.

¹ Cf. Duncan, *Inst. Log.*, L. iv. c. iii.

² Cf. Whately, *Logic*, B. ii. c. iii. § 6.

Reduction by Contraposition has also, though not generally, been employed. Thus *Camestres* :—

Every animal feels ;
No plant feels ;
Therefore, no plant is animal.

Convert the major by Contraposition—

What does not feel is not animal,
 preserve the minor, and we have the same conclusion in
Celarent :—

What does not feel is not animal ;
No plant feels ;
Therefore, no plant is animal.

So *Baroko* to *Ferio*. This was not generally received, because the converse of the minor is less clear as in effect affirmative than the simple affirmation which has been transposed into it.¹

¹ Cf. Duncan, *Inst. Log.*, L. iv. c. iii.

CHAPTER XXXI.

CATEGORICAL SYLLOGISMS—ON HAMILTON'S PRINCIPLES—FIGURED
AND UNFIGURED SYLLOGISM—ULTRA-TOTAL DISTRIBUTION.

§ 518. Hamilton has singular merit in his analysis of Figure, Major and Minor Terms, and Propositions. The whole tendency of his inquiries on this point is to simplification,—scientific completeness and unity,—leading ultimately, in fact, to the position that Figure, with all its complexities, is unessential to reasoning. The ordinary view rather led to the notion that reasoning depended on the order of expression,—certainly that the difference of Major and Minor in terms and propositions did. Hamilton has shown that reasoning depends on the internal thought,—on the essential mental relations of Containing and Contained,—of Inclusion and Exclusion in thought. His view on this point was developed prior to that of the quantification of the predicate. But this doctrine completed the theory.

§ 519. Mediate or Syllogistic Reasoning (Categorical) is, according to Hamilton, divided into two kinds—the Unfigured and the Figured. In the former, which results directly from the quantification of the predicate, and from regarding the proposition as an equation, the terms compared do not stand to each other in the reciprocal relation of subject and predicate, being in the same proposition, either both subjects or (possibly) both predicates. The canon for this form of reasoning is: "In as far as two notions (notions proper or individuals) either both agree, or one agreeing, the other does not, with a common third notion; in so far these notions do or do not agree with each other."

§ 520. In the Figured Syllogism Proper, again, the terms

compared are severally subject and predicate, and thus containing and contained. Its general canon is: "What worse relation of subject and predicate subsists between either of two terms and a common third term, with which one at least is positively related; that relation subsists between the two terms themselves."¹ The Figured Syllogism runs in the counter wholes of Intension and Extension.

§ 521. According to Aristotle's mode of statement, the middle term was intermediate in nature and in position in the two premisses. Thus:—

P is in M;
M is in S;
 $\therefore P \text{ is in } S.$

This shows the middle term, *M*, as lying in the middle and between the two extremes, *P* and *S*. But later logicians did not so enounce such a reasoning. They said:—

M is P;
S is M;
 $\therefore S \text{ is } P.$

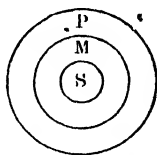
Here the middle term does not lie between the extremes; and in the Second and Third Figures it no more does so, being in the one twice predicate, in the other twice subject. The Aristotelic form indeed is suitable at once to reasoning in comprehension and in extension.

§ 522. To preserve the Aristotelic position of the middle term in extension,—the subject being usually first,—it was necessary to state the minor premiss first, even in the First Figure. This was done by a majority of the older logicians. But subsequently this order was departed from, and the major premiss was stated first, thus displacing the middle term from its intermediate position in the syllogism. Now the question arises—Is there any natural rule or law regulating the order of enunciation? In Figured Syllogism, the true principle is the relation of the middle term, as including or included under the subject of the conclusion. It matters nothing as to which premiss is placed first or last in the expression. But to avoid ambiguity that premiss which expresses the relation of the greatest to the less,—that which expresses the relation of the less to the least,—should

¹ *Discussions*, p. 654.

be placed first and second. The conclusion would, of course, state the relation of the least to the greatest. Thus, in Extension in the First Figure, we should have :—

M is contained under P;
S is contained under M;
 \therefore *S is contained under P.*



Here *P* is major, predicate of major premiss; *S* is minor, subject of minor premiss; *S* is subject of conclusion, *P* predicate. *P* = the greatest whole; *M* = the less; *S* = the least. This being so, *S* the least must be contained in *P* the greater.

§ 523. In Comprehension, the same principle would lead to the reversal of the order of the premisses. Thus :—

S is M;
M is P;
 \therefore *S is P.*

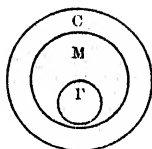
This means *S*, the greatest whole, contains in it one mark *M*; *M*, the less, contains in it one mark, the least, *P*; \therefore *S*, the greatest whole, contains in it one mark *P*, the least.

Animal contains in it sentient;
Sentient contains in it life;
 \therefore *Animal contains in it life.*

It is clear from this that as the premisses in this First Figure determine the relation of the subject of the conclusion to the predicate, as either a part contained under the predicate, or as a whole containing the predicate in it,—there can be but one immediate or direct conclusion in each of the moods, and in Extension and Comprehension. The First Figure thus still retains and admits of the distinction of major and minor terms, major and minor propositions, and the conclusion is single or direct,—in each of the quantities of Extension and Comprehension. It admits, however, of two conclusions,—a direct and an immediately inferred conclusion.¹ We can say :—

¹ *Discussions*, p. 658.

All M is (some) C;
All Γ is (some) M;
 \therefore *All Γ is (some) C.*
 Or, *some C is all Γ.*



§ 524. But let us look at the Second and Third Figures, and we shall find that we no longer have the same kind of relations between the terms, and consequently, no longer the distinction of major and minor in terms and premisses. We shall thus have two conclusions equally direct, either extreme being taken as subject or as predicate of the conclusion. In the Second Figure, the middle term is the predicate of both premisses,—not as in the first the subject of one extreme and the predicate of the other.

C is M.

Γ is M.

This form thus merely tells us that each extreme is contained under the middle, but it says nothing of the relation of the one extreme to the other. There is no subordination of greater or least. We may thus reason:—

(Some) C is (some) M;

(Some) Γ is (all) M;

\therefore *(Some) C is (some) Γ.*

Or, *(Some) Γ is (some) C.*

Here each extreme is major or minor, or neither. And there are two direct conclusions, differing only according to the manner of reading.

In the Third Figure the same holds. Here the middle term is subject in both premisses,—it is contained under each extreme. Thus:—

(Some) M is (some) C;

(All) M is (some) Γ;

\therefore *(Some) C is (some) Γ.*

Or, *(Some) Γ is (some) C.*

Here there is as little subordination of extreme to extreme—of C to Γ—and consequently the relation majority and minority in extremes is abolished. And we have two equally direct conclusions.

§ 525. Now it is obvious that we are very near the abolition of Figure altogether. We may now reason that as C is M, and Γ is M, C is Γ or Γ is C. Indeed, if we quantify the predicate, and thus reduce the proposition to a simple equation, the identity of a reasoning in all the three Figures becomes clear. The Second Figure is only the First, with the major premiss converted and transposed; the Third Figure is only the First, with its minor premiss converted and transposed. Figure is thus unessential to the validity of a reasoning. Mood alone is the essential thing. In practice, the Figures have at the same time special uses and functions. The First Figure affords a form for reasoning in Extension and in Comprehension alike. The Second Figure naturally fits Extension; for the middle term is predicate in both premisses,—each extreme is contained under it as a common whole. The Third Figure equally suits Comprehension; for the middle term, as subject of both premisses, naturally contains in it each of the extremes, as the parts of a common whole. It will thus be found, further, that the Second and Third Figures are specially suited—the one to Deductive Reasoning in Extension; the other to Inductive Reasoning in Comprehension. The general distinction between Deductive and Inductive reasoning, regarded here as processes of formal inference, is that in the former we reason downwards from the greatest whole or law to the particular instance or fact contained under it; in the latter we reason upwards from the particular instances or facts to the whole or general law. In the former case we proceed on the principle that “what belongs to the containing whole belongs also to the contained parts;” in the latter case on the principle that “what belongs to the constituent parts belongs also to the constituted whole.” Now, Deductive Reasoning naturally takes the form of Extensive Reasoning; Inductive that of Comprehensive Reasoning. For in Extension we begin with the widest notion; in Comprehension with the particular or individual fact. Thus, in the Second Figure, we should naturally have a Deductive Reasoning in Extension:—

$X\ Y\ Z$ are (contained under) all M ;
 $a\ b\ c$ are (contained under) all M ;
 $\therefore a\ b\ c$ are $X\ Y\ Z$.

Responsible persons are all man ;
Black, white, copper-coloured are all man ;
 \therefore *Black, white, copper-coloured are responsible persons.*

This inference is to the similarity or identity of the parts, through the common whole M, which contains them.

The Third Figure would suit an Inductive Reasoning in Comprehension.

•

X Y Z are all P ;
X Y Z are As ;
 \therefore *Some As are all P.*

Peter, John, &c. (12), are all the apostles ;
Peter, John, &c. (12), are zealous persons ;
 \therefore *Some zealous are all the apostles.*

This inference is to the common whole through the similarity or identity of the parts which constitute it.¹

§ 526. The distinction of Subject and Predicate, as usually taken in Extension, by the Aristotelic logicians, arises mainly from the circumstance that the predicate is supposed to be a wider notion than the subject. The subject is contained under the predicate as a part of it at least. The genus thus was predicated of the species, as *the oak is a tree*,—the species was predicated of the individual, *this tree is a birch*. The subject notion, therefore, was regarded as of less extent than the predicate. In comprehension, however, the subject might be regarded as the greater, seeing that the predicate usually expresses only one of its attributes, as *fire burns ; water runs : burning and running*, being only each a small part of the notions of *fire or water*. The subject thus comprehends the attribute, and more or others. The quantification of the predicate in extension abolishes the essential distinction of subject and predicate. We may say as we please : *all plant is some organised*, or *some organised is all plant*. The only difference of subject and predicate here would be in the accidental interest we have in the one or other, as first in thought.

(a) Robert Kilwardby, Archbishop of Canterbury (1276) (died 1279), who does not use the Byzantine art words or memorial verses, speaking of the Second Figure, says : The middle is that by which one extreme is distant from another, but, as predicated of both extremes, there is no difference in the distance, and therefore no medium. The middle

¹ Cf. *Discussions*, App. II.

is equally distant from both extremes (terms); therefore the terms are equidistant from the middle.—(Kilwardby in Prantl, iii. p. 186.)

§ 527. And carrying out this principle to its ultimate issue, we may have the simplest form of reasoning in the Unfigured Syllogism. This is the simplest form, for here we have no longer the distinction of Extension and Intension, and the order of the premisses is thus wholly arbitrary. The terms do not stand to each other in the relation of subject and predicate, being in the same proposition either both subjects or (possibly) both predicates. The formula for this is :—

Subjects :—

All C and some B are (some) convertible ;

All B and all A are (some) convertible ;

∴ All C and some A are (some) convertible.

Predicates :—

(Some) convertibles are all C and some B ;

(Some) convertibles are all B and all A ;

∴ (Some) convertibles are all C and some A.

§ 528. The canon for this reasoning is :—

“In as far as two notions (notions proper or individuals) either both agree, or one agreeing, the other does not, with a common third notion ; in so far, these notions do or do not agree with each other.” This canon excludes (1.) an undistributed middle term, as then no common notion ; (2.) two negative premisses, as then no agreement of either of the other notions therewith. In ordinary discourse we regularly use the unfigured form of reasoning when we apply the principle that, as A is equal to B, and B to C, A is equal to C. This form regulates our dealings with quantities, and our processes in Geometry.

§ 529. The Unfigured Syllogism of Hamilton is closely akin to what is known as the Expository Syllogism (*Syllogismus Expositivus, Sensilis*) of the Peripatetics and other subsequent logicians. Its principle was given as : *Those things which agree with the same singular third agree with each other. (Quæ congruunt eidem tertio singulari ea congruunt inter se.)* This syllogism was usually run through the three Figures, but it was held to be less natural in the First and Second than in the Third, where the middle was subject,—

it being held that a singular is less properly a predicate than a subject. Thus we may have in the First Figure:—

*Aristotle was a Greek ;
The author of the Analytics was Aristotle ;
Therefore the author of the Analytics was a Greek.*

In the Second Figure:—

*Aristotle was the tutor of Alexander ;
The author of the Iliad was not the tutor of Alexander ;
Therefore he was not Aristotle.*

In the Third Figure:—

*Epicurus was bold ;
Epicurus was a philosopher ;
Therefore some (a) philosopher was bold.*

This form, which is not recognised by Aristotle as a syllogism, because there is nothing in it universal, was called by him *ἐκθέσις*—that is, *expositio* or *exhibitio*, on account of its use in exhibiting the necessary sequence in the Third Figure—in those moods in which (the subject) middle term is universal. Thus, to take *Datisi*:—

*Every man may err ;
Some man is wise ;
Therefore some wise may err.*

This is expounded or exhibited by substituting for the common term *man* the individual, say *Plato*. We should thus have:—

*Plato may err ;
Plato was wise ;
Therefore some (a) wise may err.*

Here the middle is what is known as *Singulare Sensile*.¹

Ramus regarded this form of reasoning as Syllogism Proper. It is no doubt a simple and natural form; it proceeds on the principle of equation, better equivalence in subject and predicate; and, whether affirmative or negative, is independent of Figure. Hamilton's canon for the Unfigured Syllogism applies to it directly and completely.

As this form proceeds neither from the more general to

¹ Cf. Mark Duncan, *Inst. Log.*, L. iv. c. iv.

the less, nor from the less to the more, but from equal to equal, it has in these times been called *Traduction*. Only the name is new, or rather it is borrowed from Bacon (*Nov. Org.*, i. 70).

§ 530. This analysis of Figure and the Figured Syllogism enabled Hamilton to reduce all the general laws of Categorical Syllogisms to a single canon. This is really a summary statement of the Six Rules of Syllogism usually given. This canon is: "What worse relation of subject and predicate subsists between either of two terms and a common third term, with which one at least is positively¹ (affirmatively) related, that relation subsists between the two terms themselves." The six rules of Syllogism, as usually stated, are all contained under this general canon, and may be readily evolved out of it. Hamilton has added to the general canon the forms which are specially applicable to each of the Three Figures. For the First Figure, the canon is:—

"What worse relation of determining (predicate), and of determined (subject), is held by either of two notions to a third, with which one at least is positively related; that relation do they immediately (directly) hold to each other, and indirectly (mediately) its converse." This latter clause provides for the distinction between the direct and indirect conclusions in the First Figure,—the latter being obtained through immediate inference or conversion.

For the Second Figure, the canon is:—

"What worse relation of determined (subject) is held by either of two notions to a third, with which one at least is positively related; that relation do they hold indifferently to each other."

For the Third Figure, the canon is:—

"What worse relation of determining (predicate) is held by either of two notions to a third, with which one at least is positively related; that relation do they hold indifferently to each other."

The last clause in each of these rules points to the two possible conclusions in those Figures, each of which is as direct as the other.

§ 531. The expression here, "the worse relation," needs explanation. "*Sectetur partem conclusio deteriolem*," said

¹ *Positively* is misprinted *possibly* in *Discussions*, p. 654, ed. 1853.

the old logicians. Particular quantity (*some*) was worse or weaker than universal quantity (*all*); and negation was worse or weaker than affirmation. I could only predicate of some, not of all. I could not even assert anything about the subject proposed. But as they did not admit two negative propositions, the one with a particular predicate, they did not, and did not need to, determine which of two negatives, a particular or a universal, was the worse. Hamilton's system of propositional forms requires this to be done, especially as applied to Syllogism. With him thus, affirmation, as with the old logicians, is always better than negation. And the best affirmation is where we affirm *all* of *all*—*all X is all Y*; and the worst when we affirm of some only—*some X is some Y*.

In negation, again, the worst is when we deny of *all* or *any*—*any is not any*. This is in contrast to the best of affirmation, when we affirm *all* of *all*. The best of negation is when we deny only of some—*some is not some*. The worse grades of negation are *some is not any*, *any is not some*.

Any is not any is the worst in negation. If I can say that not even one is true of the subject, or is a part of it, I have said the utmost—the worst—which I can say against any assertion, that a part of the predicate is true of the subject. *Any mineral is not any organised thing*, is the utmost or worst I can deny of the subject *mineral*, especially if some one has affirmed any positive relation to *organised* about it.

All is all is the best affirmation; as *all man is all risible*. It is the best between these terms. If I had said *all man is some risible*, I don't know how many, or *all man is only some*, I should not have affirmed so much of the subject as when I said *all is all*. I have said it is not only some of which I speak, but all of which I speak. And I predicate of it not only some, but all.

§ 532. The following table shows the whole order of best and worst quantification throughout the two qualities, and how affirmation commences with the whole in inclusion (*all*), and negation with the parts in exclusion (*any*):—

- | | | | |
|--------------|--|---|--------------|
| <i>Best</i> | 1. Toto-total— <i>all is all.</i> | } | Affirmative. |
| | 2. Toto-partial— <i>all is some.</i> | | |
| | 3. Parti-total— <i>some is all.</i> | | |
| | 4. Parti-partial— <i>some is some.</i> | | |
| | 5. Parti-partial— <i>some is not some.</i> | } | Negative. |
| | 6. Parti-total— <i>some is not any.</i> | | |
| | 7. Toto-partial— <i>any is not some.</i> | | |
| <i>Worst</i> | 8. Toto-total— <i>any is not any.</i> | | |

§ 533. To the universality of the canon there is an apparent, but only an apparent exception. That is, in those moods in which the particular quantity of the affirmative conclusions disappears in the negative moods—giving place to a universal quantity in the negative. This occurs in the (negative) moods IX^a, X^b, XI^a, and XII^b.¹ In these—

Take the following—(IX.)

Affirmatively we read:—

All M is all C;
All Γ is some M;
 \therefore *All Γ is some C;*
 Or, *Some C is all Γ.*

Negatively this becomes—(IX^a.)

Any M is not any C;
All Γ is some M;
 \therefore *Any Γ is not any C.*
 Or, *any C is not any Γ.*

Take the following—(X.)

Affirmatively we read:—

Some M is all C;
All Γ is all M;
 \therefore *Some Γ is all C.*

Negatively—(X^b.)

Some M is all C;
Any Γ is not any M;
 \therefore *Any Γ is not any C.*

¹ From the table of moods, *Logic*, iv., App. v. (e) *Syllogisms*, p. 285.

Affirmatively—

Some animal is all man ;
All sentient is all animal ;
 ∴ *Some sentient is all man.*

Deny the minor—

Some animal is all man ;
Any sentient is not any animal ;
 ∴ *Any sentient is not any man.*

Or, *Some animal is all man ;*
Any mineral is not any animal ;
 ∴ *Any mineral is not any man.*

§ 534. Here the change is from a particular affirmative conclusion to a universal negative. But this is a passage simply from the worst in affirmation to the worst in negation. Had the change been from a particular affirmation to a universal affirmation, it would have been from the worse to the better, or best. But seeing that it is a change from particular in affirmation to universal in negation, it is a passage only from the worst in the one quality to the worst in the other. The validity and applicability of the canon are thus not shaken but confirmed. (So in XI^a. and XII^b.) As Hamilton has remarked: "The worst relation between either extreme and middle is here preserved in the conclusion. As affirmation comes in from the greatest whole, while negation goes out from the least part, so, in point of fact, the *some* of the one may become the *not any* of the other."¹

§ 535. With the Eight Propositional Forms as a basis, there is a corresponding increase of the syllogistic moods. A simple arithmetical calculation of the combinations (syzygies) gives 512 conceivable moods. But applying the canon, these are reduced to 36 valid moods,—12 affirmative and 24 negative. These are essentially the same through the Three Figures,—the Fourth Figure being excluded by Hamilton as illegitimate. If we pass the moods through each of the Three Figures, we get the 36 moods three times repeated, making 108 moods in all. But these are really only got through a change in expression,—the mood is always essentially the same—figure making no valid differ-

¹ *Logic*, App. iv. p. 236.

ence. No mood can be valid in one figure which is not valid in every one. Indeed, looking at the mere formal equivalence of the moods, we may reduce the number of affirmative moods to 7, and of negative to 14, — 21 in all. This arises from the circumstance of the possible interconversion of certain of the moods. In some the middle term is *balanced*,—that is, it is universal in both premisses. The extremes are *balanced* when both are taken universally; *unbalanced* when the one is so taken, and the other not. If we take the unbalanced moods iv., vi., viii., x., xii., as simply the converse of the one preceding it, which they are, only seven valid affirmative moods are left. With these five affirmatives, ten corresponding negative moods would be struck out, or reduced to the corresponding negatives of the affirmative mood which afforded the (abolished) converse. This would leave fourteen negative moods, or twenty-one affirmative and negative. The cumbrous rules of reduction are thus abolished,—simple conversion (with transposition) will enable us to turn any mood into any figure. And taking the quantification of the predicate into account, we abolish as not only useless, but false the special rules of each figure. By admitting the universality of the predicate in affirmative judgments,—the particularity of the predicate in negative judgments,—right in the face of the Aristotelic prescriptions,—we show that the usual rules of the First, Second, and Third Figures are false, and the syllogistic process stands out vindicated as one, evident, and simple,—conformable to a Single Universal Canon.

§ 536. Hamilton's Table of the Moods of Figured Syllogisms is printed at the end of the *Lectures on Logic*—the moods being also given or symbolised in the forms of his notation. The diagram representing Figured and Unfigured Syllogism alike, and in Extension and Comprehension, is to be found in the *Discussions*, p. 658. Reference may be made to these for details. The following are the twelve moods in Extension of the First Figure:—

- (1.) *All M is all C;*
All Γ is all M;
∴ All Γ is all C.

- (2.) *All M is some C ;*
Some Γ is all M ;
 \therefore *Some Γ is some C.*
- (3.) *All M is some C ;*
All Γ is some M ;
 \therefore *All Γ is some C.*
- (4.) *Some M is all C ;*
Some Γ is all M ;
 \therefore *Some Γ is some C.*
- (5.) *All M is some C ;*
Some Γ is some M ;
 \therefore *Some Γ is some C.*
- (6.) *Some M is some C ;*
Some Γ is all M ;
 \therefore *Some Γ is some C.*
- (7.) *All M is all C ;*
Some Γ is all M ;
 \therefore *Some Γ is all C.*
- (8.) *All M is some C ;*
All Γ is all M ;
 \therefore *All Γ is some C.*
- (9.) *All M is all C ;*
All Γ is some M ;
 \therefore *All Γ is some C.*
- (10.) *Some M is all C ;*
All Γ is all M ;
 \therefore *Some Γ is all C.*
- (11.) *All M is some C ;*
Some Γ is some M ;
 \therefore *Some Γ is some C.*
- (12.) *Some M is some C ;*
All Γ is all M ;
 \therefore *Some Γ is some C.*

The first mood of the First Figure is thus symbolised :—

C: — : M : — : Γ

Read in Extension it runs :—

All M is (included under) all C ;
All Γ is (included under) all M ;
 \therefore *All Γ is (included under) all C.*

Or, as an indirect conclusion,—

All C is (included under) all Γ.

Read in Comprehension, it runs thus :—

All M is (includes in it) all Γ ;
All C is (includes in it) all M ;
 \therefore *All C is (includes in it) all Γ.*

Or—

All C is (includes in it) all Γ ;
All M is (includes in it) all Γ ;
 \therefore *All C is (includes in it) all Γ.*

§ 537. Twelve pairs of premisses, with the same quantities as in the First Figure, may be run through the Second and Third Figures, and each mood may be read in Extension and in Comprehension. Thus, to take No. 2 in the Second Figure, we have :—

C, — : M : —, Γ.

In Extension, this reads :—

Some C is all M ; .
Some Γ is all M ;
 \therefore *Some Γ is some C.*

Or—

Some C is some Γ.

In Comprehension, it reads :—

All M is some C ;
All M is some Γ ;
 \therefore *Some C is some Γ.*

Or—

Some Γ is some C.

§ 538. There are thus 12 affirmative moods in each of the Three Figures—in all 36 affirmative moods. As each of these affirmatives yields by negation in turn of major and of minor premiss, two negative moods, there will be 24 negative moods in each figure, in all 72 negatives—some of which are, however, of little or no actual value. Thus, to take No. 2 of the First Figure, we have—

$$(a) \quad C, \text{---|---} : M : \text{---|---}, \Gamma.$$

No M is any C;

Some Γ is all M;

\therefore *Some Γ is not some C.*

$$(b) \quad C, \text{---|---} : M : \text{---|---}, \Gamma.$$

All M is some C;

Some Γ is not any M;

\therefore *Some Γ is not some C.*

§ 539. The symbolical notation here employed, though simple, requires a word of explanation. It is that devised by Hamilton. He has the merit of having added to Logic a system of notation which is at once simple, perspicuous, and adequate. First of all, a proposition is represented by a horizontal line. If either of the terms can stand as subject or as predicate—if, in a word, there be no distinction of Subject and Predicate, as in the Unfigured Syllogism—the line is drawn as of equal thickness throughout. Thus—

$$C \text{ ————— } \Gamma$$

C is Γ , or Γ is C, or C and Γ are equal.

But if the one term be regarded as Subject and the other as Predicate, the line is represented thus—

$$C \text{ ————— } \Gamma$$

And this proposition may be read in either of two ways, as in Breadth or in Depth. The thick end of the line represents the subject of the proposition in Breadth, and is read—

C is Γ , or C is contained or included under Γ .

The thin end of the line represents the subject in *Depth, and is read—

Γ is C , or Γ includes or contains in it C .

This applies to affirmative propositions. Negation is denoted by a perpendicular line drawn through the horizontal. Thus—

C ———+———— Γ , is read, C is not Γ .

The quantity or distribution of the terms, is indicated by points. Thus a comma (,) placed after a term indicates that it is to be taken particularly or indefinitely; a colon (:) that it is to be taken universally or definitely. As the middle term appears twice in the syllogism, it will have two separate marks of quantity. That on the right—colon or comma—indicates how it is to be taken, universally or particularly, with the term on the right; that on the left—colon or comma—with the term on the left. Further, in a syllogism the conclusion is indicated, in Breadth and Depth, by a line similar to the lines of the premisses, extending from the one extreme to the other. The following will readily illustrate the notation.

In the First Figure we may take the following :—

C , ——— : M , ——— : Γ

This is read in—

(a) Breadth.

All M is some C ;

All Γ is some M ;

\therefore *All Γ is some C .*

(b) Depth.

Some M is all Γ ;

Some C is all M ;

\therefore *Some C is all Γ .*

Negation is thus indicated—

C : ———+———— : M , ———+———— : Γ

(a) Breadth.

Any M is not any C ;

All Γ is some M ;

\therefore *Any Γ is not any C .*

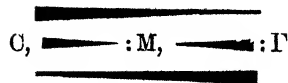
(b) Depth.

Some M is all Γ ;

Any C is not any M ;

\therefore *Any C is not any Γ .*

In the Second Figure we may take the following :—



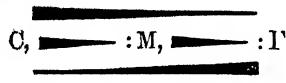
(a) Breadth.

*Some C is all M;**All I is some M;**∴ All I is some C.*(Or, *Some C is all I.*)

(b) Depth.

*Some M is all I;**All M is some C;**∴ Some C is all I.*(Or, *All I is some C.*)

In the Third Figure:—



(a) Breadth.

*All M is some C;**Some M is all I;**∴ All I is some C.*

(b) Depth.

*All I is some M;**Some C is all M;**∴ Some C is all I.*(Or, *All I is some C.*)

In the Second and Third Figures there are two horizontal lines above and below the extremes, indicating that two equally direct and immediate conclusions may be drawn in these figures. In these figures there is properly no distinction of major and minor terms, and consequently no distinction of major and minor propositions. This is true equally of the Unfigured Syllogism. It is only in the First Figure that the distinction of Breadth and Depth is preserved, and consequently that of major and minor in terms and propositions.

§ 540. The Canon of Syllogism laid down by Hamilton, § 520 *et seq.*, as proceeding on the mere formal possibility of reasoning, necessarily comprehends all the legitimate forms of quantification. "This Canon supposes that the two extremes are compared together through the same common middle, and this cannot but be if the middle, whether subject or predicate, in both its quantifications together, exceed its totality, though not taken in that totality in either premiss.¹ Accordingly, "the rule of the logicians, that the middle term should be once at least distributed [or indistributable], (*i.e.*, taken universally or singularly = definitely), is untrue. For

¹ *Logic*, iv. p. 355.

it is sufficient if, in both the premisses together, its quantification be more than its quantity as a whole (Ultratotal). Therefore, a major part (a *more* or *most*), in one premiss, and a *half* in the other, are sufficient to make it effective. It is enough for a valid syllogism, that the two extreme notions should (or should not), of necessity, partially coincide in the third or middle notion; and this is necessarily shown to be the case, if the one extreme coincide with the middle, to the extent of a half (Dimidiate Quantification); and the other, to the extent of aught more than a half (Ultradimidiate Quantification.)”¹

Thus we may reason :—

One-half of A is B ;
Two-thirds of A is C ;
 ∴ *Some C is B.*

Or—

Three-fourths of A is B ;
Two-thirds of A is C ;
 ∴ *Some C is B.*

Or—

Most of the As are Bs ;
Most of the As are Cs ;
 ∴ *Some Cs are Bs.*

In concrete examples :—

Three-fourths of the army were French ;
Three-fourths of the army were killed ;
Therefore some French were killed.

Three-fourths of the twelve pears were ripe ;
Three-fourths of the twelve pears were stolen ;
Therefore some that were ripe were stolen.

This form of quantification and reasoning was first suggested by Lambert (*Neues Organon, Dianoilogie*, § 193 *et seq.*) It has since been adopted by De Morgan. Hamilton's view of it is, so far, a sound one : “These two quantifications should be taken into account by Logic as authentic forms, but then relegated as of little use in practice, and cumbering the science with a superfluous mass of moods.”² Again,

¹ *Logic*, iv. p. 355.

² *Ibid.*

he lays down the principles which ought to limit a genuine science of Logic in the following words: "Such quantifications are of no value or application in the one whole (the universal, potential, logical), or, as I would amplify it, in the two correlative and counter wholes (the logical and the formal, actual, metaphysical), with which Logic is conversant. For all that is out of classification, all that has no reference to genus and species, is out of Logic, indeed out of Philosophy; for Philosophy tends always to the universal and necessary. Thus, the highest canons of Deductive Reasoning—the *Dicta de Omni et de Nullo*—were founded on, and for, the procedure from the universal whole to the subject parts; whilst, conversely, the principle of inductive reasoning was established on, and for, the (real or presumed) collection of all the subject parts as constituting the universal whole. 2°, The integrate or mathematical whole, on the contrary (whether continuous or discrete), the philosophers contemned. For whilst, as Aristotle observes, in mathematics genus and species are of no account, it is, almost exclusively, in the mathematical whole that quantities are compared together, through a middle term, in neither premiss equal to the whole. But this reasoning, in which the middle term is never universal, and the conclusion always particular, is—as vague, partial, and contingent—of little or no value in Philosophy. It was accordingly ignored in Logic; and the predesignations *more, most, &c.*, as I have said, referred to universal, or (as was most common) to particular, or to neither, quantity."¹ This is a true insight into the real essence and needs of logical reasoning, as a universal means of thinking, and consequently of logical science. These words hold in themselves the condemnation, scientifically and practically, of the "advances" in Formal Logic, made on geometrical and algebraical lines, of De Morgan and Boole, and even of the more enlightened Jevons.

§ 541. A reasoning in which the middle term is never definitely known, and in which accordingly we have always a vacillating and particular conclusion, is of no use practically, or in the wide sphere of probable thought. Scientifically, it is a mere tentative,—ending in *some is some*,—a mere ap-

¹ *Logic*, iv. pp. 353, 354.

proach to satisfactory certainty. And even when the premisses are made numerically definite, as with De Morgan, the reasoning is of not the slightest use unless in reference to numbers and a numerical or mathematical whole. It is really of not the smallest consequence, as a rule, that we should know the exact numerical proportion of the middle term to the extremes. We seldom do know it, as a matter of fact, and when we do, we may remit the calculation to arithmetic.

§ 542. It ought further, I think, to be noted in connection with this form of reasoning, that it readily lends itself to material fallacy, or a conclusion materially untrue. No doubt, in the abstract, *if $\frac{3}{4}$ of Y are X, and $\frac{1}{4}$ of Y are Z, some of the Zs are Xs.* So *if X contains (the part) Y, and Y contains (the part) Z, X contains Z.* But this latter formula embodies the law of inference from genus to species, or from whole to part. The other formula does not. It does not tell us in what relation X stands to Y, or Z to Y, whether that of part and whole, or of subject and attribute. Nor do we know, taking X and Z as attributes, whether they are compatible with each other or not. The practical application of the bare formula is therefore of but little use, and readily leads to material error. Thus, if we say:—

$\frac{3}{4}$ of the potatoes were diseased ;

$\frac{1}{2}$ was eaten by the crows ;

Therefore the crows must have eaten some of the diseased ;

this is correct, because there was not a half left not diseased.

If, however, we substitute for *diseased*, *hard as a stone*, we should on the same formula have the conclusion *that the crows ate some potatoes hard as a stone.* There is nothing in the formula itself to prevent us substituting for X and Z incompatible attributes. Thus the following is quite compatible with the formula:—

Three-fourths of men are saints ;

Three-fourths of men are sinners ;

Therefore some who are saints are sinners.

Such a formula can thus give a valid and true conclusion only in certain matter,—where the distribution refers to a whole of which the predicates are parts, or in which they

are compatible attributes. In fact, the necessary premisses are :—

Three-fourths of the Ys are Xs ;
Three-fourths of the Ys are [also] Zs ;
Therefore some of the Zs are Xs.

Or, if three-fourths of Y are X,
And if three-fourths of Y are Z,
And if X and Z represent things which coexist in the
same (or are compatible),
Then some Z is X, or some Z may be thought to be X.

CHAPTER XXXII.

CATEGORICAL SYLLOGISMS—COMPREHENSIVE REASONING—
THE FIVE SYLLOGISTIC FORMS.

§ 543. The Aristotelic Categorical Syllogism proceeds mainly, if not exclusively, in the quantity of Extension. But according to later views, as we have seen, we have reasoning in Comprehension as well.

§ 544. In the view of Hamilton, every notion has not only an Extensive but an Intensive quantity—breadth and depth—and these quantities always stand in an inverse ratio to each other. It would thus seem likely that if notions bear a certain relation to each other in Extension, they must bear a counter-relation to each other in Comprehension. Hence there will be reasoning in Comprehension, as there is reasoning in Extension. In Extension the reasoning runs :—

All responsible agents are free-agents (i.e., are contained under the class);

Man is a responsible agent (i.e., contained under the class);

Therefore man is a free-agent (i.e., contained under the class).

In comprehension we necessarily invert the process of this reasoning. The notion *free-agent*, which in the extensive reasoning is the greatest whole or major term, becomes in comprehension the smallest part or minor term, and the notion *man*, which is in extension the smallest part or minor term, now becomes the greatest whole or major term. The notion *responsible agent* remains the middle term in both reasonings; but what was formerly its part is now its whole, and what was formerly its whole is now its part. In Comprehension we reason thus :—

*The notion man comprehends in it the notion responsible agent ;
The notion responsible agent comprehends in it the notion free-
agent ;*

*Therefore the notion man comprehends in it the notion free-
agent.*

In Extension.

B is A ;

C is B ;

∴ C is A.

In Intension.

C is B ;

B is A ;

∴ C is A.

Thus, by reversing the order of the premisses and the meaning of the copula, we can always change a categorical syllogism of Extension into one of Intension, and *vice versa*. The reasoning in Comprehension has been generally overlooked by logicians ; but it is genuine, and it is prior to extensive reasoning in the order both of nature and knowledge. Aristotle gives a definition of the middle term, which applies to the comprehensive reasoning.¹

§ 545. Hamilton holds broadly that whatever mood and figure is valid in the one quantity is valid in the other, and every anomaly is equally an anomaly in both. The rules of Extensive reasoning are equally applicable to the Comprehensive reasoning, with the single proviso that all that is said of the sumption (major premiss) in extension is to be understood of the subsumption (minor premiss) in comprehension, and *vice versa*.

§ 546. Of course the mere transposition of the premisses does not constitute the difference between reasoning in Comprehension and in Extension ; that depends on the inner relation of the subject and predicate of the propositions as whole and part, or as part and whole. The transposition of the premisses in Extension or in Comprehension might, as Hamilton elsewhere remarks, be made without changing the essential character of the reasoning. It would not be natural, but it would not affect the reasoning as a mental process. But the position of the premisses as indicated is the natural way of showing when we reason in Comprehension or in Extension. Of course, it is hardly necessary to say in passing that Hamilton does not, as Mill states, make the distinction of Comprehension and Extension depend merely on the transposition of the premisses.²

¹ *Logic*, L. xvi. p. 299, and above, p. 407.

² *Examination*, p. 505.

§ 547. The quantities of Breadth and Depth are explicitly held by Hamilton to be merely views of the same relation from opposite points, not things in themselves different.¹ He combats the view that the reading a proposition in depth in contrast to its reading in breadth is "not another reading of the same proposition, but another proposition derived inferentially, though not syllogistically."

He holds very distinctly that *Breadth* and *Depth*, though named quantities, are really one and the same quantity, viewed in counter-relations and from opposite ends. Nothing is the one which is not, *pro tanto*, the other. Though different in the order of thought (*ratione*), the two quantities are identical in the nature of things (*re*). In effect it is precisely the same reasoning, whether we argue in Depth or in Breadth. Thus, in Depth, we may argue the individual *Z* is (or contains in it attribute) some *Y*; all *Y* is some *U*; all *U* is some *O*; all *O* is some *I*; all *I* is some *E*; all *E* is some *A*; therefore *Z* is some *A*. (Take *Socrates, Athenian, Greek, European, Man, Mammal, Animal.*)

In Breadth, the argument would be the same: Some *A* (i.e., as class contains under it the subject part) is all *E*; some *E* is all *I*; some *I* is all *O*; some *O* is all *U*; some *U* is all *Y*; some *Y* is *Z*; therefore some *A* is *Z*. (Reverse the concrete concepts already given.) Hamilton adds that as the proposition in either quantity is only an equation, only an affirmation of identity or its negation, the substantive verb *is* or *is not* expresses the relation more accurately, than *containing* and *contained*,—whether *in* or *under*. We are told, also, that in syllogisms the contrast of the two quantities is abolished, and the differences of figure, major and minor, premiss and term, likewise disappear.

§ 548. It has been objected to this that "the two modes of reading propositions in Depth and Breadth are not convertible; the extensive mode gives the intensive, but not *vice versa* in all cases." "In the affirmative, any portion of the intension of the predicate may be affirmed of the subject; in the negative, it is not true that any portion of the intension of the predicate may be denied of the subject. Thus, 'No

¹ See *Discussions*, p. 697. Hamilton gives the fullest and most explicit account of his views on Breadth and Depth in Reasoning in connection with the Table figured in *Discussions*, p. 699.

planet moves in a circle,' gives us a right to deny any constitutive attribute of circular motion to that of a planet, but not any attribute; not, for example, the progression through every longitude."¹

Against this Hamilton strongly maintains that the correlation of Breadth and Depth in Propositions and Syllogisms is thoroughgoing,—universal,—applying equally to affirmative and negative. The rule is: "The predicate of the predicate is, with the predicate, affirmed or denied of the subject." "All that enters into the predicate notion is denied of the subject, if the predicate itself be denied." There is no difference whatever between "constitutive" and "attributive" in the case. We have nothing to do with what has been previously known or discovered. We have only to do with what we formally think.

In saying, "No planet moves in a circle," we do not universally deny of a planet *any* progression through every longitude, but we deny of it a *circular* progression—that is, a particular kind. And so it is also when we say *Newton is not Leibnitz*. Here every attribute of Leibnitz is denied of Newton—contradictorily denied. But we say again, *Leibnitz is a mathematician*, or *mathematician* is an attribute of Leibnitz. Do we infer that Newton is not a mathematician? That the attribute *mathematician* does not belong to Newton? We do, and we do not. We deny that Newton is a *certain* mathematician—*this* mathematician who is Leibnitz. But we deny inferentially nothing more. We do not exclude Newton from the whole of the class mathematician. We only exclude him from that unit of it which is identical with Leibnitz. We infer that Newton is not the mathematician Leibnitz,—we spoke of nothing more than this in connection with Leibnitz; but it would be going beyond our premisses to deny absolutely that Newton is a mathematician. So far as De Morgan's criticism is concerned, the answer is complete; but there are some points about the nature of comprehensive reasoning which require attention and examination.

§ 549. It seems to me that in Hamilton's vindication of the Comprehensive Reasoning there is a tacit change in the minor premiss from Comprehension to Extension. To put it formally:—

¹ *Discussions*, p. 697. De Morgan, as there quoted,

(The concept) Newton does not contain in it (the concept) Leibnitz;

i.e., the one sum of attributes in Newton does not contain in it any of the other sum in Leibnitz.

But (the concept) Leibnitz contains the concept (attribute) mathematician;

Therefore (the concept) Newton does not contain the concept (or attribute) mathematician.

Here it seems to me that the proper and logical conclusion is that Newton does not contain the attribute *mathematician*. We avoid this only by reading the minor premiss in Extension, not in Comprehension; and think of *a mathematician* or one of the class mathematicians, and thus only are we able to allow in the conclusion that Newton is not *a mathematician*, or this one of the class. But this seems to me to be a reasoning which does not proceed wholly in Comprehension, but really both in Comprehension and in Extension.

To put it in letters:—

X (the individual Newton) does not contain in it Y (the individual Leibnitz);

Y (Leibnitz) contains in it the mark Z (mathematician);

Therefore X (Newton) does not contain in it the mark Z (mathematician).

No, only the mark Z in so far as it is in Y; but this amounts to making the predicate “the mark Z (mathematician)” equivalent to one or some mathematician only,—for we have not said that Y alone contains the mark Z, in which case X could not contain the mark Z. We have thus introduced into the minor premiss the conception of distributed quantity—that is, extension.

§ 550. If we mean by the sum of attributes *certain* specific attributes, *a, b, c, &c.*—*man, mathematician, &c.*—the concept Newton, or other attributes regarded as in it, are not those which are actually or numerically in Leibnitz. But then the denial here is not in respect of the attributes properly regarded, but of the distribution of them, and would mean that while the same attributes logically considered may be or are in both individuals, they are yet numerically different; or there are several of the same kind—only the one individual

has them as well as the other. In this case, our denial merely amounts to saying that the individuality of Newton is not the individuality of Leibnitz, or there are two units, possessing, it may be, logically identical attributes. But this cannot be regarded as a conclusion wholly in comprehension.

§ 551. It seems to me that in all this the nature of reasoning in Depth or Comprehension is virtually identified with that in Extension or Breadth. If the proposition in each be an equation, we have in each extensive quantity. It matters little or nothing to the nature of a reasoning whether we begin with the individual or the genus, if in each process we require to introduce *all* and *some*, or extensive quantity into the premisses. We are no longer reasoning from one indivisible attribute, or indivisible sum of attributes, to another; but from one quantity of these to another, and that is precisely reasoning in Breadth. If Hamilton had persistently kept in view the principle of the indivisibility of the attribute which he laid down some time before these views were given in the *Discussions*,¹ he might have developed a doctrine of strictly Comprehensive Reasoning; but as it is, he does not seem to me to have done so.

§ 552. The defects of the theory of reasoning in Comprehension come out most markedly in relation to negative conclusions. Here, in fact, it seems to me to break down, when left wholly to itself.

The law for affirmatives as given by Hamilton is: "The predicate of the predicate is, with the predicate, affirmed of the subject." Thus:—

Man includes in it sentient;
Sentient includes in it capable of suffering;
Therefore man includes in it capable of suffering.

Or—

Socrates is son of Sophroniscus;
Sophroniscus is Athenian;
Therefore Socrates is Athenian.

This is quite valid,—and is strictly a reasoning in Comprehension. But take the other half of the rule—that for negatives—"The predicate of the predicate is, with the predicate, denied of the subject." Thus:—

¹ See *Logic*, iv. Appendix v. (c), p. 271.

Man does not include in it mineral ;
Mineral includes in it weight ;
Therefore man does not include in it weight.

This is wholly invalid as a reasoning in Comprehension. All that is denied is *some* weight,—the weight that is in mineral. But this is in Extension, and the conclusion is so cloaked as to be deceptive.

Again, suppose we reason thus :—

Socrates is not the son of Eutryphon ;
Eutryphon is Athenian ;
Therefore, Socrates is not Athenian.

This is invalid. Here we are not entitled to infer that *Socrates is not Athenian*. The mark of the mark is the mark of the subject itself, but what is not the mark of the mark is not necessarily not the mark of the subject itself. The premises do not exclude Socrates from being the son of a man who was *Athenian*. This holds true, so long as we keep to the limits strictly of the Comprehensive reasoning. The conclusion no more follows than if we were to argue that what is not a part of this part is not a part of the whole. Thus :—

Mortal contains man ,
Man does not contain horse ;
Therefore mortal does not contain horse.

Or—

Man has for its part European ;
European has not for its part African ;
Therefore man has not for its part African.

This, of course, explicitly quantified would be quite valid. Thus :—

Man has for its part European ;
European has not for its part African ;
Man has not for (this one) of its parts African.

§ 553. Hamilton, in dealing with the Intensive Syllogism in the Lectures¹ lays down the rule that “the sumption must in quality be affirmative, and the subsumption in quantity definite (that is, universal or singular).” This is the converse of the rule for the Extensive Syllogism, which is, “that the

¹ *Logic*, L. xvii.

sumption must in quantity be definite; the subsumption must in quality be affirmative."

To illustrate the former rule he gives—

*S comprehends M ;
M does not comprehend P ;
Therefore S does not comprehend P .*

Or—

*Prudence comprehends virtue ;
But virtue does not comprehend blameworthy ;
Therefore prudence does not comprehend blameworthy .*

If we were to say that *prudence does not comprehend learning ; but learning comprehends praiseworthy*, we could draw no conclusion, either that *prudence* does or does not comprehend *praiseworthy*.

Then the subsumption must be universal or singular—i.e., definite.

*Prudence is a virtue ; i.e., prudence comprehends virtue ;
(Some) virtue is praiseworthy—i.e., some virtue comprehends praiseworthy .*

Here there is no conclusion, "for the indefinite *some virtue* does not connect the major term *prudence* and the minor term *praiseworthy* into the necessary relation of whole and part."¹

§ 554. In the first place, it seems to me that there is no valid conclusion in the illustration given. *Virtue is a mark of prudence*, i.e., *the attribute virtue is an attribute of prudence ; the attribute blameworthy is not an attribute of virtue ; it does not follow from this that the attribute blameworthy is not an attribute of prudence*. We might just as well argue that because *animal life* is an attribute of man, and *weight* is not an attribute of *animal life*, that *weight* is not an attribute of man. What is not simply a mark of the mark is not necessarily not a mark of the thing itself. It may yet be so, either directly or indirectly. And to introduce universal quantity or definitude into the subsumption or minor proposition, is to depart from the form of reasoning in comprehension altogether,—to introduce, in fact, an extensive premiss. And it is, besides, futile. If I say :—

*Prudence comprehends virtue ;
(All) virtue does not comprehend blameworthy ;
Or, Blameworthy is not in any part of virtue ;*

¹ *Logic*, L. xvii., iii. p. 317.

I cannot infer that *blameworthy* is not in *prudence*; but only not in *that part of prudence* which is convertible with *virtue*. If I say :—

Man comprehends animal life ;
No animal life has weight ;

I cannot, therefore, say that no man has *weight*, but only that *weight* is not in that part of man which is convertible with *animal life*. But *weight* may be an attribute of man, after all.

Praiseworthy (S) is a mark of learning (M) ;
Learning (M) is not a mark of prudence (P) ;
Therefore praiseworthy (S) is not a mark of prudence (P).

Taking S, M, and P to represent attributes throughout, and each attribute in its indivisibility, this is a bad reasoning. We have, in fact, in the premisses compared attributes as indivisible wholes with each other, and in the conclusion drawn an inference limiting their distribution or distributive application.

§ 555. As thus put, reasoning in Comprehension with a negative conclusion is illogical. There are two special conditions which must be fulfilled, ere it is at all valid. These are (1.) Where the attribute of the subject is assumed to be alone or single. In this case, we could argue from the attribute wanting another specific attribute, that this is also absent from the subject—

E.g., *S has the (single) mark M ;*
M wants the mark P ;
∴ S has not the mark P.

In the case of a Defining Proposition, in which the subject and predicate are necessarily convertible, we may have a negative reasoning in Comprehension.

Thus we may reason :—

Oratory is the art of persuasive speaking ;
Sculpture is not a mark or part of persuasive speaking ;
∴ Sculpture is not a part or mark of oratory. 346

In this case, however, the predicate or mark of the subject must be convertible with it—that is, it must be its single mark.

(2.) Where the mark of the mark is in contradictory relation,—or absolute repugnance. As :—

S (Animal) comprehends M (Organisation) ;

M (Organisation) does not comprehend P = not-M (Non-organisation) ;

$\therefore S$ does not comprehend P .

But this is hardly worthy of the name of reasoning. We have immediately implied the absence of P (not- M) in the assertion of M .

(3) There is a third case where the mark implies the necessary exclusion of another mark—as contrary, incompatible, or repugnant.

The soul is an indivisible unity ;

An indivisible unity has not extension (is contradictory of extension, or extension is contradictory of indivisible unity) ;

Therefore the soul has not extension.

M is an invariable mark of S ;

P never is a mark of M ;

$\therefore P$ never is a mark of S .

If M be supposed in every S , and P never in any M ; yet P may be a mark of S ,—for it may have other marks than M . But if it be alleged that P cannot coexist with M , or is repugnant to M being at all, then we may infer, on the supposition that M is an invariable mark of S , that P never is a mark of S . But this is to state much more in the premisses than the simple fact of the one being or not being a mark of the other. Thus :—

Electricity (s) has the mark (m) of travelling along a tied nerve ;

The nervous fluid (p) has not the mark (m) of travelling along a tied nerve ;

\therefore *Electricity (s) is not the nervous fluid (p).*

Here the marks are absolutely repugnant—contradictory—travelling and not-travelling along a tied nerve. Hence the reasoning is sound.

(a) Professor Bowen in his able and clear exposition of the logical doctrines of Hamilton, offers a solution of the difficulty here stated, which I cannot regard as satisfactory. He says—“ In intension the parts are not species, but attributes or marks, and these do not exclude each other. Each part or attribute here interpenetrates, so to speak, and informs the whole. Black is a part of negro in the sense of being only one of his attributes, since he has many others, such as being long-heeled, prognathous, &c. ; but it is a part which colours the whole, for the

negro is *black all over*. . . . The maxim for the reasoning in comprehension is that *a mark of the mark is also a mark of the thing itself*, of the *whole thing*. *Free agency*, which is a mark of *responsibility*, is also a mark of *man*, because *responsibility* is a mark of the *whole man*." Thus read, the above syllogism would be valid. "*S has M for one of its marks or attributes*. *M*, though only one of the attributes of *S*, affects or colours the *whole* of *S*; therefore *P*, which is *not* an attribute of *M*, is not an attribute of *S*. Thus—

A negro has a black skin ;
But a black skin is not an invariable sign of a brute intellect ;
Therefore a negro is not necessarily brutish in intellect."

It seems to me that this does not meet the difficulty. We have here a totally different conclusion from that alleged in the formula.

S comprehends M ;
M does not comprehend P ;
 \therefore *S does not comprehend P.*

The parallel reasoning should have been :—

A negro has a black skin ;
The notion of a black skin has not the mark or notion of a brute intellect ;
Therefore the notion negro has not the mark or notion of a brute intellect.

This absolutely stated is illogical. And when we argue that because being brutish in intellect is not the mark of a black skin, the negro is not brutish in intellect, we state a very different conclusion from that which follows when we argue that because a black skin is not invariably or necessarily a sign of a brutish intellect, a brutish intellect is not invariably or necessarily a sign of the negro. This means merely that so far as these signs go, it is not proved that the negro is brutish in intellect. But it is not proved that he is *not* brutish in intellect, which is the conclusion required. The two cautions already laid down are necessary. Either the mark of the subject is single, exclusive of others, or convertible with the subject; or the mark of the mark is essentially repugnant to—contradictory of the mark of the subject.

§ 556. The Canon of Comprehension should, therefore (for negatives), run thus :—

A mark repugnant to a mark of the subject is repugnant to the subject itself.

Or, *A mark contradictory of a mark of the subject is contradictory of the subject itself.*

For affirmatives: *A mark essential to a mark of the subject is essential to the subject.* This is necessary :—

S contains M ;
M contains P ;
S contains P.

It is only as M contains P always, or essentially as part of it, or identical with it, that we can be sure that S always or essentially contains P. If M contains P only sometimes, or now has it, and then not, we cannot have the conclusion that S contains P.

Thus, if we reason :—

*Poison is a mark of every mineral acid ;
No mineral acid has for its mark digitalis ;
Therefore poison is not a mark of digitalis.*

This is clearly incorrect. It is equivalent to :—

If this be a mineral acid, it is a poison ; but it is not a mineral acid ; therefore, it is not a poison.

Here is the usual hypothetical or equivalent categorical fallacy.

But we may reason validly thus :—

*Man has the mark morally responsible ;
Necessitated volition is repugnant to (incompatible with) moral responsibility ;
Therefore man does not possess the mark necessitated volition.*

In Extension this would run :—

A *Man is morally responsible ;*
E *A being with necessitated volition is not morally responsible ;*
E *Therefore a being with necessitated volition is not man.*
= *Camestres.*

The result is that mere exclusion is not sufficient for a comprehensive negative conclusion. As we are not dealing with classes, but with attributes, and as these are indivisible, the attributes must not only lie out of each other simply, but must be mutually incompatible.

This, I apprehend, was what was dimly and imperfectly recognised in the phraseology of the negative rule—*Repugnans notæ est repugnans rei ipsi.*

§ 557. From what has been said under the head of the Categorical Syllogism, it may be inferred that there are at least three kinds of Categorical Reasoning, To these I propose to add other two—viz., those marked (3.) and (5.)

(1.) There is the Extensive Reasoning. In this the predicate in both premisses is taken as the *genus* of the subject. Thus :—

Animal is organised;
Man is animal;
Therefore man is organised.

The characteristic of this reasoning is, that as it passes from genus to species and individual, what is predicated in the genus of the subject is predicated of the species or individuals of the subject, but not conversely. For what may be said of the species need not be said of the genus, and so of the individual and species. *Animal is, therefore man is*, does not follow. *Animal is, therefore risible is*, does not follow.

§ 558. (2.) There is the Comprehensive Reasoning, strictly so called, in which the predicate is taken as *attribute* of the subject, be it *mark, property, action*. Thus:—

Plant has organisation;
Organisation has reciprocity of vital action;
Therefore plant has reciprocity of vital action.

§ 559. (3.) There is the Combined Extensive and Comprehensive Reasoning. Here the predicate will be taken in one premiss as *genus*, in the other as *attribute*. Thus:—

All Xs have the mark Y (Comprehension);
All Zs belong to the class of Xs (Extension);
Therefore all Zs have the mark Y (Comprehension).

All gold is a metal;
All metal has the mark lustrous;
Therefore all gold has the mark lustrous.

This form of reasoning, though not usually recognised in Logic, is in common, even necessary, use; and, in fact, is the formula according to which we most usually subsume the individual under the general. How am I to know, I may ask myself, whether this substance I have found is a metal or not? Only by some mark—say *lustrous*. Thus through the mark I refer it to its class. Will the oats be a good or bad crop this season? I might determine this through certain marks—as the yellow look of the baird, the shortness of the straw, the poverty of the ear, &c., and so on. This is really a mixed reasoning, partly in Comprehension and partly in Extension. It occurs constantly in pure Geometry.

§ 560. (4.) There is the Syllogism of Equivalence,—the reasoning from equal to equal. This is the Unfigured Syllogism of Hamilton—the Expository Syllogism of others. The former is wider than the latter, which referred only to Singulars; but Hamilton, by making equivalents in quantity, widened its scope. There is not only reasoning from *this* to *that*, or individual A to individual B, but from the equivalence of *all* of one class to *some* of another. The formula of the Syllogism of Equivalence is, however, in all cases the same. What are equivalent, or non-equivalent, to a common third term, are equivalent or non-equivalent to each other.

*If X be equivalent to Y,
and Y to X,
X is equivalent to Y.*

*If all X be equivalent to some Y,
and all Z be equivalent to all X,
all Z is equivalent to some Y.*

§ 561. (5.) To these I am disposed to add a fifth form—what I would call the Syllogism of Collection. Here we literally gather into one in the conclusion what we stated separately, yet as implicated, in the premisses. Thus:—

*The crops this season are good in quality;
The crops this season are good in quantity;*

*Therefore the crops this season are good both in quality and
in quantity.*

So negatively:—

*The crops this season are not good in quality;
They are not good in quantity;*

Therefore they are not good either in quality or quantity.

This is a perfectly simple form of reasoning,—in common use,—though not fitting into any of the received formulae,—nay, in the negative form, even apparently violating the rule against two negative premisses. The law may be generalised thus: *Where the same middle term admits of predicates of opposite kinds or genera, these, when both positively related, may be affirmed, or, when both negatively related, may be denied, of the middle term as subject of the conclusion.* This reasoning differs from the ordinary forms by admitting middle as subject of the conclusion, and in the negative

form the rule against double negatives does not apply, for the comparison has been instituted not through comparing major and minor through the middle, but collating major and minor in succession with the middle. The middle again appearing as subject of conclusion, with the gathered predicates, constitutes the conclusion naturally and simply a *collectio*—collection.

CHAPTER XXXIII.

OF COMPLEX AND INCOMPLETE REASONINGS — DEDUCTIVE —
CHAIN-REASONING : EPICHEIREMA — SORITES — ORDINARY
ENTHYMEME.

§ 562. According mainly to the manner of enunciation or expression, a reasoning may be Simple or Complex, Complete or Incomplete. A reasoning is simple in nature when it contains three and only three related propositions, constituting a single reasoning. It is simple in expression when these propositions are explicitly stated in the order either of Extension, Comprehension, or Equivalence. This is properly a *Monosyllogism*—that is, a single independent reasoning.

§ 563. But Syllogisms may be connected in a succession or series, and thus stand to each other in the relation of antecedent and consequent. This is regarded as a composite or complex reasoning, and is called a *Polysyllogism*, also a *Chain-syllogism* or *Chain of Reasoning*.

§ 564. In a *Chain of Reasoning* the order may be either that of thing proved and reason, or of reason and thing proved. In other words, "each successive syllogism is the reason of that which precedes it, or the preceding syllogism is the reason of that which follows it." The former order is called the *Analytic* or *Regressive*; the latter is the *Synthetic* or *Progressive*. The reason-containing Syllogism is called the *Prosyllogism*; the consequent-containing Syllogism is called the *Episyllogism*.¹ If the Chain of Reasoning be composed of more than two links, the same syllogism may be, in different relations, prosyllogism and episyllogism.

§ 565. A polysyllogism, not explicitly enounced, is made

¹ Cf. Krug, *Logik*, § iii. ; and Hamilton, *Logic*, iii. 364.

up either of partially complete and partially abbreviated syllogisms, or of syllogisms all equally abbreviated. In the former case we have what logicians call the *Epicheirema* (ἐπιχείρημα); in the latter the *Sorites*.¹ Of the *Epicheirema* or Reason-rendering Syllogism, the following is an example :—

X is Y ;
But Z is X, for it is D ;
Therefore Z is also Y.

*It is permissible to take the life of a man who lays an ambush
 with the purpose of taking yours ;*
*Milo, therefore, was justified in killing Clodius, for Clodius
 had laid an ambush against Milo's life.*²

§ 566. The Chain-syllogism proper or *Sorites* (σωρείτης, *coacervatio, congeries, gradatio, climax, de primo ad ultimum*) arises when we carry on the principle of Inference beyond the part of the highest part, and take in the part of that part, and so on through a series of successive parts.³ Thus a simple syllogism would run :—

(All) *B is a part of A ;*
 (All) *C is a part of B ;*
 ∴ (All) *C is a part of A.*

But we may proceed thus :—

B is A—i.e., A contains B ;
C is B—i.e., B contains C ;
D is C—i.e., C contains D ;
E is D—i.e., D contains E ;
Therefore E is A—i.e., A contains E.

In this case we have the Chain-syllogism or *Sorites*, and this example in Extension. The predicate is the containing whole.

But the ordinary logical *Sorites*—sometimes called the *Aristotelian*—really proceeds in Comprehension, and this is the more natural form. Thus :—

¹ Esser, *Logik*, § 104 ; Hamilton, *Logic*, iii. 364.

² Cicero, *pro Milone*. See *Port Royal Logic*, p. 231.

³ See especially Hamilton, *Logic*, iii. L. xix., who gives the best analysis of this form of reasoning, and who for the first time accurately stated its history.

E is D—i.e., has the mark D ;
D is C—i.e., has the mark C ;
C is B—i.e., has the mark B ;
B is A—i.e., has the mark A ;
Therefore E is A—i.e., has the mark A.

Here the subject is the containing whole, and the predicate the contained part. Both of these forms are *Progressive*, in the sense of proceeding from whole to part in the respective quantities.¹

A concrete example in Comprehension is found in the following:—

Every body is in space ;
What is in space is in one part of space ;
What is in one part of space may be in another ;
What may be in another part of space may change its space ;
What may change its space is movable ;
*Therefore every body is movable.*²

(a) Sorites, a *heaper*, is from *σωπὸς*, a *heap*, and originally designated the sophism named by Cicero *accrualis*. The Sorites, as the name for a form of reasoning, is not to be found in Aristotle. Nor was the form of reasoning afterwards designated Sorites developed by him, though it is improperly named the Aristotelian form.—(See the reference in *An. Pr.*, i. 25.) The name was probably first applied to the reasoning by Valla in his *Dialecticæ Disputationes*, published after the middle of the fifteenth century.—(See Hamilton, *Logic*, iii. p. 377.) Mark Duncan thinks this form is called the *heaper*, because as grain is superadded to grain in a heap, so proposition is superimposed on proposition in the reasoning. His definition of it is “an argumentation in which the attribute of every prior proposition is the subject of the posterior until, through several middles, we reach the term to be connected with the subject of the first proposition. It contains as many syllogisms as there are propositions between the first and the last.”—(*Inst. Log.*, L. iv. c. vii. § 6.)

§ 567. It is easy enough to state each of these in a Regressive form.

Hamilton lays down the rules: “In the Progressive Sorites of Comprehension and in the Regressive Sorites of Extension, the middle terms are the predicates of the prior premisses and the subjects of the posterior; the middle term is here in position intermediate between the extremes. On the contrary, in the Progressive Sorites of Extension and in the

¹ Hamilton, *Logic*, iii. p. 366.

² Hamilton, *Logic*, iii. p. 381.

Regressive Sorites of Comprehension, the middle terms are the subjects of the prior premisses and the predicates of the posterior; the middle term is here in position not intermediate between the extremes."¹

§ 568. The Sorites known as the Goclenian—being that first formulated by Rudolph Goclenius of Marburg²—is the Regressive Sorites in Comprehension. The difference may be shown thus:—

(1.) Progressive Comprehensive, (2.) Regressive Comprehensive.

- | | |
|----------------------|----------------------|
| (1.) <i>E is D ;</i> | (2.) <i>B is A ;</i> |
| <i>D is C ,</i> | <i>C is B ;</i> |
| <i>C is B ,</i> | <i>D is C ;</i> |
| <i>B is A ;</i> | <i>E is D ;</i> |
| <i>∴ E is A .</i> | <i>∴ E is A .</i> |

- (1.) *Bucephalus is a horse ;*
A horse is a quadruped ;
A quadruped is an animal ;
An animal is a substance ;
Therefore Bucephalus is a substance .

- (2.) *An animal is a substance ;*
A quadruped is an animal ;
A horse is a quadruped ;
Bucephalus is a horse ;
Therefore Bucephalus is a substance .

It is to be noted that these reasonings are both progressive, in the sense that prosyllogism precedes episyllogism in each.

§ 569. The rules of the common Sorites are as follow: "1°, The number of the premisses is unlimited. 2°, All the premisses, with the exception of the last, must be affirmative, and, with the exception of the first, definite. 3°, The first premiss may be either definite or indefinite (Universal or Singular, or Particular). 4°, The last may be either negative or affirmative."³ The reasoning would thus be vitiated in two ways—(1.) by a particular premiss in the series after the first; (2.) by a negative premiss between the first and the last.

¹ *Logic*, iii. pp. 379, 380.

² *Goclenii Isagoge in Organum Aristotelis*. Francof., 1598: p. 255.

³ Hamilton, *Logic*, iii. pp. 371, 372.

To these it should be added that in the case of a negative conclusion in Comprehension, the mere denial of the predicate is not enough. This denial must, in accordance with the principles already laid down, be a statement of incompatibility or contradiction between subject and predicate.

§ 570. If it be thought necessary to resolve the Sorites into Simple Syllogisms, the rule is that there are as many simple syllogisms as there are middle terms between the subject and predicate of the conclusion, or propositions between the first and the last. But the truth is, that the Sorites is simply the natural form of a sequence in reasoning; without the useless repetition of conclusions, which everybody of ordinary intelligence is able to supply.

§ 571. The Enthymeme is usually regarded as an incomplete or defective reasoning, — one of the promisses, major or minor, being suppressed, or retained in the mind. Thus: (a) *The air has weight, for it is body.* The major is here suppressed. (b) *Every murderer deserves death; therefore this man deserves death.* The minor is here suppressed. As Hamilton has pointed out, even the conclusion may be understood or suggested merely. Thus:—

“Sunt monachi nequam; nequam non unus et alter;
Præter Petrum omnes: est sed et hic monachus.”¹

§ 572. The Enthymeme is wrongly regarded as a special form of reasoning co-ordinate with syllogism. It arises simply from the need of expressing thought in a terse and abbreviated form. As Mark Duncan has well put it: “Dicitur syllogismus imperfectus non respectu mentis, sed prolationis: nam in mente proponentis integer esse potest et solidus syllogismus, etsi proferatur truncatus.”²

Duncan and the older logicians, who really knew something of the literature of the subject, were well aware that Aristotle gave no countenance to the view of the Enthymeme as a specific form of reasoning. They were also well aware of the fact that, with Aristotle, Enthymeme does not signify a syllogism or abbreviated expression at all, but a reasoning from signs and likelihoods,—a reasoning, in fact, of probability.³

¹ *Logic*, iii. p. 593.

² *Inst. Log.*, L. iv. p. 252.

³ See Duncan. *Inst. Log.*, L. iv. p. 251. On the nature and literature of the Enthymeme, see especially Hamilton, *Lectures on Logic*, L. xx., and *Discussions*, p. 154. He there clears up the whole matter,—leaving almost nothing more to be done.

§ 573. Enthymematic expression is not simply an accident, but a necessity of language in a rhetorical interest. What is evident is passed over. What is prolix is avoided. What is brief is sought after ; and what can be left through suggestion to the imagination or reason of a hearer or reader, is allowed to make for itself its special effect. Some of the finest effects alike in oratory and in poetry are made through enthymematic expression. Thus :—

Ἀθάνατον ὀργὴν μὴ φύλαττε, θνητὸς ὤν.

(Mortal, cherish not immortal hate.)

“ When, fast as shaft can fly,
Blood-shot his eyes, his nostrils spread,
The loose rein dangling from his head,
Housing and saddle bloody red,
Lord Marmion's steed rushed by.”

—SCOTT.

CHAPTER XXXIV.

INDUCTION—FORMAL AND MATERIAL—ANALOGY.

§ 574. According to the view of Categorical Reasoning which makes it dependent on the Law of Identity, or whole and part, it is obvious that we may reason not only from the whole or genus to the parts, but conversely from the parts to the whole. In the former case we have Deductive Categorical Reasoning, in the latter Inductive Categorical Reasoning. In the latter case we argue from “the notion of all the constituent parts discretively, to the notion of the constituted whole collectively. • Its general laws are identical with those of the Deductive Categorical Syllogism, and it may be expressed, in like manner, either in the form of an Intensive or of an Extensive Syllogism.”¹

§ 575. Strictly formal induction has been named Perfect Induction or Perfect Enumeration, as compared with Imperfect Induction or Enumeration. In the former case, there is an enumeration of all the singulars under the species, or of all the species under the genus—*i.e.*, under the universal in question. The latter founds merely on some of the singulars under the species, or some of the species under the genus—*i.e.*, under the universal in question. Aristotle recognised the distinction of reasoning either from singulars or from parts to the whole. He regards Induction as *ἐπαγωγή ἢ ἀπὸ τῶν καθ’ ἕκαστον ἐπὶ τὰ καθόλου ἐφοδος*, and as *ἐκ τῶν κατὰ μέρος*.²

Thus, to take singulars, we have Perfect Induction in the following:—

Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus, Neptune, are opaque bodies lit by the sun;

¹ Hamilton, *Logic*, iii. p. 318.

² *An. Post.*, i. 18.

*These are all the primary planets;
Therefore all the primary planets are opaque bodies lit by
the sun.*

To take species :—

*Gold, silver, copper, tin, lead, zinc, platinum, iron, are
(all) the most malleable metals ;
These are (all) the most useful ;
Therefore all the most malleable are the most useful metals.*

In Imperfect Induction we may reason thus :—

*This, that, and the other magnet attracts iron ;
This, that, and the other magnet represent all magnets ;
Therefore all magnets attract iron.*

Or—

*This, that, and the other criminal was about 25 years
of age ;
This, that, and the other criminal represent the majority
of criminals ;
Therefore criminals of about 25 years of age are the majority.*

§ 576. Aristotle recognised Formal Induction ; and thus distinguished Syllogism and Induction. In propositions which have a middle term, syllogism takes place by this middle ; in those which have not, it takes place by induction. We may thus say that induction is in some sort opposed to Syllogism ; for this demonstrates the extreme of the third term through the middle ; that demonstrates the extreme of the middle through the third term. Thus then the syllogism which is produced by a middle term is, in nature, prior and more known ; but that which is formed by induction is for us more evident.¹

§ 577. To illustrate this by his own example :—

(C)=minor.	(A)=major.
<i>Every man, horse, mule is long-lived ;</i>	
(C)=minor.	(B)=middle.
<i>Man, horse, mule is all devoid of bile ;</i>	
(B)	(A)
<i>Therefore all devoid of bile is long-lived.</i>	

¹ *An. Pr.*, ii. 23.

Or—

Every X Y Z is A ;
X Y Z is all B ;
Therefore all B is A.

This is a reason apparently in the Third Figure ; but in it, according to the ordinary rule, it is illegitimate, because the conclusion is universal. But the conclusion is legitimated on the principle that when two terms are attributed wholly to a third, and when this third is reciprocal to the second of the two terms, the first of these terms is also attributable to the second. On this ground Aristotle may be supposed to rest the inductive syllogism as a valid independent form. No doubt he seems to suggest in (§ 4) the conversion of the minor premiss into

All devoid of bile is man, horse, mule.

We should thus have the inference in *Barbara* of the First Figure. Thus :—

Every man, horse, mule is long-lived ;
All devoid of bile is man, horse, mule ;
Therefore all devoid of bile is long-lived.

But this is by no means conclusive, though through the emphasis given to the moods of the First Figure by subsequent logicians, the validity of the inductive form has been made unwarrantably to depend on its capability of reduction to this Figure. The validity of the inductive form obviously depends on the principle, which Aristotle himself elsewhere expressly disavows, of the universality of the predicate in an affirmative proposition—in fact, on the recently much-questioned form *all is all*. But this may be taken as an instance at once of its validity and utility.

(a) Aristotle evidently recognises Material Induction when he tells us that “induction is a progress from singulars to the universal, as if the skilled pilot is the best, and the skilled charioteer, the skilled in every genus is the best ;” and especially when he adds that “induction is more fitted for persuasion, and more certain as well as more evident to the sense and common to the many ; but syllogism presses with a greater necessity and repels opponents with greater force.”—(*Top.*, i. 12.) Formal induction is, of course, as cogent as (Deductive) syllogism. We have also the recognition of Imperfect Induction as the basis of the reasoning from Example (see below, p. 484 *et seq.*)

In the following passage, however, he refers obviously to that form

of Induction in which the Universal is constituted through a complete enumeration of the parts.

"There is, therefore, induction, and inference from induction, when we conclude one of the extremes of the middle by the other extreme. Thus, for example, if B is middle of A Γ , to demonstrate by Γ , that A is B; for this is how we make the induction. Let A be long-lived, B that which has not bile, and C all long-lived animals, as man, horse, mule, &c. Then A is in C all entire; for all C is long-lived; but B also, that is, that which has no bile, is in all C; if, then, C is reciprocal to B, and does not exceed the middle, it is therefore necessary that A is in B; for it has been demonstrated that any two things being the attributes of the same subject, if the extreme is reciprocal to one of them, it is necessary that the other attribute should also be in the reciprocal attribute. Further, it ought to be supposed that C is composed of all the particular cases; for induction comprehends all. Such is the syllogism of the primitive and immediate proposition."—(*An. Pr.*, ii. 23.)

There are other passages in which Aristotle referred to what we call material induction, as, for example, *An. Post.*, i. 18; ii. 19. He tells us expressly that imperfect induction is only allowable, where there is no contrary instance (*ἐναντίας*).—(*Top.*, vii. 8.) And he certainly practised it not without success in his *History of Animals*. In this use of the inductive method he but followed Hippocrates in medicine. But the truth is, there has been no time in the history of observational science in which Material Induction has not been followed more or less faithfully. Even Bacon, who signalised and emphasised the method—mistaking, at the same time, the place and scope of the Formal Induction and Deduction of Aristotle—had before him, as exemplifying the method, Copernicus, Kepler, and Galileo. Newton but took up the thread of the predecessors of Bacon, with the advantage of the illumination which Bacon had thrown on the method. Even Newton's deduction could be verified only by Bacon's observation and induction, as to coincidence with actual fact.

§ 578. Hamilton regards Induction as proceeding equally in Comprehension and Extension, and gives the following formulæ for Induction:—

A. In Comprehension—

(1.) (The parts holding the place of the major term S.)

X Y Z constitute M;
M comprehends P;
Therefore X Y Z comprehend P.

(2.) (The parts holding the place of the middle term)—

S comprehends X Y Z;
X Y Z constitute P;
Therefore S comprehends P.

B. In Extension—

(1.) (The parts holding the place of the major term P).—

X Y Z constitute M ;

S is contained under M ;

Therefore S is contained under X Y Z.

(2.) (The parts holding the place of the middle term)—

X Y Z are contained under P ;

X Y Z constitute S ;

Therefore S is contained under P.

§ 579. Perfect Induction may very properly be extended to cases in which there has been the observation or analysis of the individual constituent elements of a concrete, say physical whole. Thus we may reason :—

Quartz, felspar, and mica are all the constituents of ordinary granite ;

Ordinary granite is an igneous rock ;

Therefore quartz, felspar, and mica are all the constituents of an (some) igneous rock.

Or—

Cognition, feeling, desire, will, are all the phenomenal manifestations of mind in man ;

Mind in man is the only mind we directly know ;

Therefore cognition, feeling, desire, will, are all the phenomenal constituents of mind directly known to us.

This principle applies very strictly to the constitution of geometrical figures, to all chemical analysis of bodies ; and it serves to explain how, from a single analysis of a body or description of a figure, we are able to extend our analysis or description to all similars.

Thus geometrical demonstration may be taken as a form of Perfect Induction, although in it we specify only a single figure. Exhibiting only a single diagram, we are able in a valid demonstration to draw a conclusion which is not only true, but necessarily true. As the latter it is universal, that is, applies to every figure of the same character. Thus, given a parallelogram, or a four-sided figure of which the opposite sides are parallel, it can be proved that the opposite sides

and angles of this figure are equal to one other; and that the diameter bisects the parallelogram, that is, divides it into two equal parts.¹ This, as a consequence, necessary and necessarily true, applies to all parallelograms whatever, and we need but the one figure through which we demonstrate the conclusion. The confidence with which we extend our conclusion to all figures of the same class,—whether these actually exist or are only ideally conceived, whether they agree or not in size, material, &c., with the one figure we know,—is based on the conception and conviction of the essential similarity of all the other figures to the one before us. This may possibly in the end be found to depend on the nature of the matter—space or extension—about which we reason, and its adaptability to explicit or essential definition. In the same way, we may demonstrate the most abstract relations of numbers in Algebra, through formulæ which, while independent of any given number, are yet applicable to all which fall under the specified conditions. In Arithmetic there is an approach to this universality, for we know, for example, that $10 + 10 = 20$ in all instances and in every kind of matter, whether we speak of pence, pounds, or shillings—of pears, apples, or men.

In the case of Chemical Analysis, the resolution of a single body, that is, specimen of a class, may enable us to ascertain the exact constituents of each substance of the class—as in the case of water. Here electricity enables us to decompose water “into two perfectly different substances, oxygen and hydrogen gases, and into nothing else,” and to show “that water when thus decomposed yields twice as large a volume of hydrogen as it does of oxygen.”² We are confident after this analysis that any example of water afterwards taken will yield those elements. This is founded, however, partly on the direct evidence afforded by the analysis of the single sample, and on an inductive law already established, that chemical combination is constant in its nature,—that it takes place according to uniform law; one feature of this law being that it does so most readily between those bodies which least resemble each other.

§ 580. The practical value of Perfect Induction lies in its enabling us to summarise particulars or details in one total

¹ Euclid, Prop. 34.

² Roscoe.

concept or expression. Under its guidance we may unite in one expression particulars which otherwise we should be obliged specially and tediously to enumerate. It has thus an important synthetic value, as enabling us to predicate of the whole of a series of particulars or individuals known to lie within certain limits. We can predicate definitely of *all the apostles, all the months of the year, all the people in this room, all the objects at a given time, or in a given space, &c.*, only through the form of Perfect Induction.¹

§ 581. Material Induction and Analogy are both founded on the principle known as the presumption of the Uniformity of Nature. Without, meanwhile, entering into a consideration of the ground and genesis of this principle, it is enough for the present purpose to refer to the two applications of it in Induction and Analogy.

In Material Induction we proceed from the parts—that is, some of the parts—to predicate of the whole or class of things to which these belong. The part may be an individual thing, or a species; but ultimately what we found on is the individual of observation or experience. Thus—

*This, that, and the other metal has a peculiar lustre ;
But this, that, and the other metal represent all metals ;
Therefore all metals have a peculiar lustre.*

Or—

*A B C D have each the attribute Y ;
A B C D belong to the same class X ;
Therefore the whole class X has the attribute Y.*

Such an inference supposes at least two things—(1.) That no negative or contradictory instance be given or known; and (2.) That the attribute is not a merely temporary, passing, or accidental state of the individual, but permanent and essential. This, of course, raises the question as to what an essential attribute is. To this point I have already referred.² It means in this connection, as we shall see, causal relation or sequence.

(a) "Material or Philosophical Induction," says Hamilton, "is not so simple as commonly stated; but consists of two syllogisms and two deductive syllogisms, and one of them an Epicheirema. Thus:—

¹ Cf. Jevons, *Logic*, p. 214.

² See above, p. 102 *et seq.*

- "I. *What is found true of some constituents of a natural class, is to be presumed true of the whole class (for nature is always uniform); a a' a" are some constituents of the class A; therefore what is true of a a' a" is to be presumed true of A.*
- "II. *What is true of a a' a" is to be presumed true of A; but Z is true of a a' a"; therefore Z is true of A.*

"It will be observed that all that is here inferred is only a presumption founded, 1°, on the supposed uniformity of nature; 2°, That A is a natural class; 3°, On the truth of the observation that a a' a" are really constituents of that class A; and 4°, That Z is an essential quality, and not an accidental."—(Hamilton, *Logic*, iv. p. 368.)

§ 582. In regard to the statement that Induction supposes a natural class, it ought to be noted that it is often required to establish a natural class. Induction is indeed necessary in order to establish the concepts of species and genera, in all cases in which these do not depend on mere observation and description of coexisting features, as in Descriptive Botany, Zoology, &c. A species or genus which is constituted through a knowledge of the essential attributes of a thing,—through its properties,—is the concept of the causal or constant relation of that thing to its properties.

In many cases we have the concept of the causal sequence when we do not know more than the immediate terms, and are unable to run back the relation to anything higher,—as in gravity, chemical affinity, electrical attraction of two metals in juxtaposition.

§ 583. The difference between Formal and Material Induction appears to lie in this,—that in the former case there is an actual enumeration of all the individuals in the class; in the latter there is no such enumeration, but only a statement of some. In the former case, we infer of all in the conclusion because we have supposed or are certain that all the individuals constituting the class have been enumerated; in the latter we infer of all in the conclusion because the some—one or several—are taken on extra-logical grounds known to us to be capable, in a given respect or attribute, to represent all of the class. In both cases the whole is supposed to be constituted, but in different ways; and in both cases the mere formal inference may be regarded as hypothetically necessary,—the one on the assumption of the actual enumeration of all, the other on the assumption of the guaranteed equivalence of some in a given respect to the *all* in that respect. So far

as the formal inference is concerned, there is no difference; for before we infer, logic receives or accepts the totality. •

§ 584. In elevating the *some* observed into the *all* unobserved in the minor premiss of the Material Inductive Syllogism, there is always a weakness in the assumption made that the observed cases actually represent the whole of the unobserved or possibly observable cases. And a single instance to the contrary—an *instantia*—is sufficient to destroy the universality. “Una instantia, cadit inductio.” Thus, let us reason:—

This, that, and the other metal are between seven and eight times heavier than an equal bulk of water;

This, that, and the other metal represent all metals;

Therefore all metals are between seven and eight times heavier than an equal bulk of water.

This is formally good; but we have been given erroneous data, for the metal *lithium*, to say nothing of *potassium* and *sodium*, is lighter than an equal bulk of water. The validity of the formal inference in such a case is really of subordinate importance. The point to be attended to is the ground of the equivalence stated in the minor premiss.

§ 585. It must at the same time be admitted that there are very few cases in actual practice in which we can have absolute assurance of a perfect enumeration. We may have it in the case of numerical definitude, as the number of the apostles, or the number of the primary planets—though in the case of the planetoids it would have been rash and wrong, as a matter of fact, to stop at any ascertained number during the last forty years, as it would be rash to do so now. In Geometry, our enumeration of the species of triangle, &c., may be quite definite and complete. But usually, even in what is known as perfect enumeration, there is a certain amount of assumption; and one contrary instance would destroy the universality, just as one contrary instance in the minor premiss in material induction would destroy the universality. Considered as formal inference, both—as seems to me—are only hypothetically necessary, and in this respect the one is as strict as the other.

(a) As Bacon remarks, perfect induction is especially liable to be contradicted by a simple opposite instance turning up, or may depend

on imperfect knowledge of the existing cases. The true or material induction is through an analysis of experience, by means of proper rejections and exclusions, and after or through negations to conclude the affirmation.—(*Nov. Org.*, i. 105.)

§ 586. Whately, without properly distinguishing Formal and Material Induction, makes the Inductive Syllogism deductive with the expressed major, which is usually understood. "What belongs (or does not belong) to the individuals we have examined, belongs (or does not belong) to the whole class under which they are contained." But in truth there is neither really nor formally any such principle as thus expressed, and such a proposition could form no valid major premiss for a reasoning—no law that could necessitate an inference. This is really an inadequate expression of the minor premiss in the Material Inductive Syllogism. The observer working on experience thinks himself justified, by wholly extra-formal considerations, in saying that the instances which he has examined warrant him in making them stand for or represent all the possible instances of the kind or class. It is true that they are only *some*, but on their nature or character he judges them to be equivalent to *all*. This handed over to the formal logicians is translated into the proposition that these—*some*—represent *all*, or are *conceived* to represent *all*,—and the proper conclusion is, that the property which they manifest is thus conceived as applicable to the whole class. If we take the common illustration, *this, that, and the other magnet represent all magnets, or are all magnets*, the conclusion is necessary *that all magnets attract iron*; but the conclusion is only necessary on the formal law of whole and part, and it is only necessary hypothetically—that is, given these as being all, the conclusion follows.¹

(a) Induction, in the view of Trendelenburg, "only sums up the fact of the universal from the individuals, while Analysis seeks the universal cause from the given phenomenon." But Ueberweg objects "that the so-called analytical procedure must take the inductive form, and scientific induction the 'analytical' element, which refers to the causal nexus. Hence every such distinction only corresponds to that of the 'formal' and 'real' sides of Induction."—(*Logic*, p. 487.)

§ 587. Syllogistically in Imperfect Induction a particular conclusion alone is possible. If *this, that, and the other magnet*

¹ Cf. Hamilton, *Discussions*, p. 167 *et seq.*

attracts iron, then it follows that *some magnet attracts iron*. This can hardly be called a syllogistic inference: it is merely a summation, or at best an immediate inference, for there is as yet no third term. But what we have to establish further is, that *attracting iron* is a property not only of the individual magnets we have observed, but of every one or all. How is this to be done? How is it possible? It is possible, in the first instance, on the supposition or assumption or ascertained principle that the two things, *magnet* and *attracting iron*, may stand in the general relation of cause and effect; and, in the second instance, on the ascertainment, through certain tests or rules, that they do as a matter of fact so stand. If it can be found that *magnet* in this case is a cause, and that its property is *attracting iron*, then we have found what in point of fact is an invariable or universal relation between the subject and the predicate. And on this ground we extend the limited or observed relation—all that actual experience can give us—to the unlimited and unobserved, and constitute our partial observation but essential knowledge into the type of the class, or the condition of future possibility. This leads us back to the notion and principle of Causality, and to the principle of uniformity or invariableness in the manifestations of Causality—in other words, to the law that similar antecedents are followed by similar consequents. This is not itself the law of Causality: it is a most inadequate expression for the law; but it is a manifested property of the law, and it is that through which we are able actually to determine what things are causes and what effects amid the numerous relations of mere sequence or succession.

(a) Does the predicate, asks Ueberweg, belong to the subject because of its generic nature or its individual nature? or because of accidental circumstances?—that is the problem of Induction.—(Ueberweg, *Logic*, p. 485.) If the first question can be answered in the affirmative by the experience of a single instance, as is quite possible, we need no more cases: we have got the causal relation, and this is universal.

§ 588. The reference of Induction, says George, to the objective causal nexus is a circle, since the knowledge of the real nexus is always based upon incomplete inductions. To this Ueberweg replies: The causal nexus as existing precedes our inductions; but our knowledge of it in a universal form

results after a multiplicity of special inductions.¹ But the question really is: How are we to know that the predicate—say, *attracting iron*—is an effect of each magnet observed? This can only be by observing that one after another of magnets attracts iron—that this actually happens. How many of these observations entitle us to say that *magnet* is cause in this case?—that it is of the nature of the magnet to attract iron? The force of the inductive illation lies there,—that is, in our knowing from observation that a causal relation really is,—for the causal relation is, as a matter of generalisation, only another expression for universal and invariable relation. What, in other words, enables us to pass from the mere sequence, from which we could never infer universality, to the causal sequence from which we can? Only the number and kind of the instances. But our test of this cannot be the causal nexus itself in the things, for as yet we do not know it—we are seeking to find whether it exists or not in the instances in question. A sequence that has occurred in a given number of instances in certain circumstances may be supposed or presumed by us to happen again in similar circumstances, from the number of times or the frequency with which it has already occurred. That this sequence is the result of a cause, and a permanent cause, if known to us, would no doubt explain the expectation of the recurrence; but as we cannot know it to be due to a permanent cause until we have generalised the successive instances of the sequence, we cannot possibly say that the knowledge of a causal nexus in things is the only ground of our expectancy for the future. We have in this three distinct stages—(1.) The experience, more or less frequent, of the sequence. (2.) The reference of the sequence to a cause and a permanent cause in nature—definitely known. (3.) The expectation based on this of the invariable recurrence of the sequence in the future, provided the antecedent be the same or similar.

This would be the strongest form of Inductive Expectation, or the widest universality. But it is conceivable—nay, a fact—that we have experience of uniformities of sequence, whose cause we cannot discover,—or which are not known to be connected causally,—as *day and night, light and darkness*;

¹ *Logic*, p. 490.

and yet we expect the recurrence of these with as much confidence as if we knew them to be causally related. It is thus, as seems to me, to be a narrowing of the grounds of the Inductive Inference to limit it to a knowledge of causal relations among things. Mere constancy in experience is as frequently the ground of our inference. This is essential to our knowledge of the causal relation itself in any given instance, and we should properly cherish a probable expectancy even where we could not discover causality at all, or at least were not aware of its actual existence. Mankind confidently expected the recurrence of night after day, and day after night, long before any one was aware of the daily revolution of the earth round its axis. And even now we should confidently expect rain rapidly to dissolve limestone rock, although we might not be aware that the main causal efficiency lies in the carbonic acid taken up by the rain.

§ 589. For the inductive illation proper,—from the *some* to the *all*,—no one formula—no *a priori* formula—can be stated, nor can we prescribe by formula beforehand the number of cases which warrant a universal inference. For syllogism we can lay down one universal rule, founded on the very conditions—the very possibility of human thinking; for Induction we can do no such thing. Violate the syllogistic law and thinking no longer exists; it is only in appearance. Violate any of the laws of Induction, and you do not abolish the process; you only conduct it wrongly. There is thus the absolute distinction between what is fundamental in human thought—the very condition of it—and what is needed in the application of thinking. An incoherent syllogism is not a syllogism; is not even thinking. An imperfect, hasty, or unwarranted induction is still an induction, only a bad one.

§ 590. “Almost all induction,” says Hamilton, “is necessarily imperfect; and Logic can inculcate nothing more important on the investigators of nature than that sobriety of mind which regards all its past observations only as hypothetically true, only as relatively complete, and which, consequently, holds the mind open to every new observation, which may correct and limit its former judgments.”¹ Mr Jevons has amply endorsed this opinion.² “No imperfect induction,” he says, “can give a certain conclusion. It may be highly

¹ *Logic*, iv. p. 170.

² *El. Logic*, p. 213, cf. p. 223.

probable or nearly certain, that the cases unexamined will resemble those which have been examined, but it can never be certain. It is quite possible, for instance, that a new planet might go round the sun in an opposite direction to the other planets. . . . Mistakes have constantly occurred in science from expecting that all new cases would exactly resemble old ones. Imperfect induction thus gives only a certain degree of probability, or likelihood that all instances will agree with those examined."

§ 591. This is not the place to enter on a discussion of the ground of the principle of the Uniformity of Nature, as it is called, or of the belief in Cosmical Order. I can afford space only for a remark, in passing, on Hume's well-known view on the subject, and for a few paragraphs in which what seems to me the true theory may be indicated.

It may fairly be said that the ground Hume alleges—viz., custom or customary experience—is obviously insufficient as a ground, on his own theory of knowledge, or on any theory of knowledge. Custom is but repetition, or the constant recurrence of impressions in a certain uniform order. Whence, we ask, is this recurrence,—this uniform recurrence,—this order in the subjective impressions? From the Ego, is it? Does it depend on a permanent self in consciousness amid the impressions? No; for, according to Hume, there is no such thing,—no self or subject of impressions. But whence, then, does the order come,—the custom of the uniformity in the impressions? Not surely from the custom itself; for while this may be put forward to explain the expectancy of the recurrence in the future, it cannot reasonably be taken as explaining itself. Whence still, one asks, a customary uniform order of impressions, if there be nothing behind it, or alongside of it, acting in a customary and uniform manner? Would this not be not only the most mysterious but the most irrational of all conceptions of the fact, to say nothing of the origin, of experience? And, further, how possibly can there be a known series or order of impressions,—many, varied, successive,—if there be no permanent knower in or amid the series subsisting through time,—looking behind and before,—and through a continuous knowledge grasping the isolated impressions, as they fly, into one comprehended whole of succession?

§ 592. The principle known as that of the Uniformity of Nature, which is at the root of inductive illation, may, as I think, be regarded as founded on causality, and as simply its manifest application. We have, in inductive illation, the following stages—(1.) The ascertainment by observation, analysis, experiment of the number of cases, which varies in different matter, necessary for the inference that they depend on a definite cause. The problem here is truly to distinguish casual sequence from causal sequence. For this no one general rule can be given, either *a priori* or founded on experience, such as we have in Deductive Inference.

(2.) Once the step is taken from merely casual to causal sequence, we then attach the uniformly observed to a cause, and to this or that cause. The cause is known as existing, and as manifesting certain definite relations or properties. It has now two features, (a) that of permanency or stability, and (b) that of uniformity implying generality. For if a cause acts, and always in a similar way, the law of its action is general. If the mode of action is changed, the cause itself is changed.

§ 593. (3.) Induction is not confined to cases in which the causes are merely similar; it operates where the cause is itself single, but subsists during a continuance of time. When precisely the same cause—numerically one—is found after a lapse of time, by inductive inference we predict that its manifestations will be as they were originally inductively established. The same hammer which split the stone yesterday, is expected, when applied in the same circumstances, to split another stone to-day. Let the wind withdraw the cloud from the sun, and it will be expected to shine now as it did an hour ago.

§ 594. (4.) The inductive illation of cause from observed uniformity of sequence extends beyond the same permanent cause to similar causes—that is, to causes sensibly similar—for thus only by sense-appearance can we judge of similarity in causes. Hence we get the general principle at the root of all induction which takes in similars—viz., that of general effects of the same genus the causes are the same, or similar causes produce similar effects, or similar antecedents are followed by similar consequents.

§ 595. (5.) The principle, accordingly, of the uniformity of

nature, or of the expectation of similar consequents from similar antecedents, is resolved into two elements:—

(a) The conception of a cause as manifesting certain properties or effects.

(b) The presumed stability of the cause, on the ground mainly that we do not know, or have not observed, that its causal efficiency has been impaired or destroyed. This could only be done by the supposition of another cause acting in the interval, and impairing, destroying the efficiency of the cause whose operations were inductively known. On the absence of any knowledge to this effect, we continue to expect that the cause we have known as operating will subsist and operate as before. This applies especially and in the first instance to a cause which is the same in time, or numerically one. It applies, in the second place, and not less, to a cause similar to the cause which we have known as operating. For here we connect the sensible appearance of the cause with its causal efficiency, as we did in the first instance observed. We suppose that under a similar appearance we shall find a similar causal efficiency, and this because we have not observed or do not know that another cause has been in operation to deprive it of this supposed efficiency. This seems to me to be the genesis of the principle known as the uniformity of nature. It is the only theory of it which fully accounts for its place and character in our knowledge,—for the principle, while it is almost universally operative in ordinary experience, in the conduct of affairs, in the guidance of life, in professional work, and in the highest science, is never necessary,—never gives results of absolute irreversible import, yet leads with probability, and even cogently constrains. And this feature of it—its most characteristic feature—is at once explained by the fact that our expectation of recurrence in the future is determined by the condition that we do not know that any negative or destructive cause has been at work. This theory of the Inductive Principle is at once positive and negative, or rather is positive and non-negative. It supposes a cause, and a cause to subsist, until the proof of its negation or destruction has been given. It is thus in its essence a principle simply of Probability.

§ 596. (6.) This principle of uniform expectation being once in operation, it receives confirmation from the fulfilment of

the expectation in given cases. Every time we expect a similar consequent from a similar antecedent, and find it follows, our belief in the principle of uniformity is strengthened. This confirmatory experience reacts on the original presumption of uniformity, until it gradually becomes one of our most familiar, most firmly established, and most trusted principles.

§ 597. While Syllogism is an inference from whole to part, and Induction an inference from the parts to the whole, Analogy may be regarded as inference from individual to individual, or from part to part.¹ Generally speaking, the inference of Analogy is founded on similarity, and it proceeds from partial to total similarity in objects,—from likeness in some points to likeness in all. The formula of it is: Many in one, therefore all in one.

In Induction we proceed from the fact that a property or mark belongs to many objects of a class, and infer that it belongs to all of the class. The formula is: One in many, therefore one in all.²

§ 598. Analogy must not be confounded with Proportion, or a resemblance of ratios. Thus we have proportion when two numbers agree in being half of another yet different number, as—2 is to 4, as 5 is to 10. These are definite or known ratios in each case. In Analogy proper there is a similarity of objects in certain known properties, and an inference to similarity in certain other unknown or unobserved properties.

§ 599. The Inference of Analogy has two main forms,—(1.) It may proceed from some individuals of a class to another or other individuals of the class; (2.) From several known attributes in an object to other attributes in that object not known or observed. In both cases, however, it proceeds from the known to the unknown—from the individual to the individual, or from the mark to the mark. These are not essentially different forms of Analogy.

§ 600. Of the First Form of Analogy the rule may be thus generalised: (1.) A property which is known to belong to several members of a class, probably belongs to another member of that class, in which it is not observed or not capable from circumstances of being observed, provided

¹ Cf. Aristotle, *An. Pr.*, ii. 24.

² Cf. Kant, *Logik*, § 84. Krug, *Logik*, § 168. Hamilton, *Logic*, iv. p. 173.

always the known property belongs to the several members of the class in their generic capacity.

Thus, in letters :—

A, B, C, D (individuals of a class X), have the property Y ;

F also belongs to the class X ;

Therefore probably F has the property Y.

Ceres, Pallas, Juno (all of them planetoids), have the property of greater eccentricity of orbit ;

Vesta is also a planetoid ;

Therefore probably Vesta has the property of greater eccentricity of orbit.

§ 601. Of the Second Form of Analogical Inference the rule may be generalised as follows :—

(2.) If one object agrees with another in certain known properties, it is probable that it will also agree with it in all its other properties, in so far as these are generic and not individual merely.

Thus, in letters :—

If we find in X the marks a, b, c, d, and if we find in Y a, b, the probability is, that Y also contains the marks c and d.

Or—

This disease has the marks a and b ; a and b are usually accompanied with c and d in jaundice ;

This disease will probably develop the marks c and d ;

In other words, The disease will probably be jaundice.

The Earth,—a planet, revolving on its axis, having an atmosphere, water, change of seasons, &c.,—supports organic life ;

Mars is a planet, revolving on its axis, having an atmosphere, water, change of seasons, &c. ;

Therefore Mars probably supports organic life.

§ 602. In both those forms the force of the argument will increase in proportion to the number of the resembling features, their nature as not temporary and individual, but as permanent and generic. We shall fall into error, as we found on attributes known to be common to the two objects, while the unobserved attribute inferred is connected not with these but with points of difference between the objects. Thus X may resemble Y in the points a, b, and it may also possess the

points *c, d*, because it is one individual and *Y* is another,—in this case we should have no inference. If *X* be a statesman, able, eloquent, modest, and truthful; and *Y* is a statesman, able and eloquent; it does not follow that *Y* is modest and truthful. For *modest* and *truthful* are by no means generic properties of a statesman.

§ 603. Another element which adds to the force of Analogical Inference—especially in the Second Form—is that of time or circumstance in which a particular set of marks may be observed. If, for example, in the course of a disease, not exactly known as to its nature, the physician were to note the development in succession, or in anticipated circumstances grounded on previous observation, of certain symptoms, he would, with the probability of being right in the end, infer that the other symptoms which usually follow these would in due course be developed, and thus be able to forecast the real nature of the malady. He would, in a word, infer the unknown from the known—the undeveloped from the developed—on the principle of Analogy; and the force of the inference would depend not only on the nature of the symptoms, but on the fact of their specification or precise limitation in time.

§ 604. One special form of analogy—the Third—may be called that of Analogy of Function. Thus the geologist who finds a fossil skeleton similar to the structure of an animal of the present day fitted to browse on herbage, will readily infer that this also was a function of the creature whose fossil remains are found. This can hardly be said to be similarity in another or new property, but the completion or integration of the idea involved in structure. Yet it is properly an Analogical Inference.

§ 605. Both Astronomy and Geology are now prosecuted in the large spirit of analogy. Laws of motion, similar to those on this planet are supposed to hold in regard to the planetary bodies. And the causes and laws of change operative on the globe at the present time, are accepted as the grounds of explaining the geological phenomena of the past.

§ 606. In Induction, and also in Analogy, the essential point is the determination of the value of the individuals or of the attributes as capable in the one case of standing for the whole members of the class; in the other, of guaranteeing the community of the further attribute or attributes inferred.

And the inference in each case points to a common cause or principle upon which the individuals and the attributes, observed and unobserved, but inferred, are to be taken as dependent.

§ 607. Induction and Analogy are to a large extent the grounds of syllogistic inference, inasmuch as it is from them that we obtain our major proposition; but they are not the regulative principles of the pure illation. Nor is it correct to say, as Hegel apparently does,¹ that these are the only grounds or bases of universality in the inference. Geometry, not less than Metaphysics, repudiates this.

¹ *Encycl.*, § 90.

CHAPTER XXXV.

THE METHODS OF INDUCTION.

§ 608. It has been said—(1.) “That in the complexity of things or sequences, observation and experiment are needed to analyse the accidental from the essential or permanent, and to determine regarding a given phenomenon that upon which its real existence depends—that is, its cause or condition—for all the finite is conditioned.

(2.) “That we must seek not only the conditions which determine the existence of a phenomenon, but the properties which exclude it or which are indifferent to it.”¹

We thus need certain rules and methods of Observation and Induction, in virtue of which we may find what is invariably connected in experience; mainly, in a word, distinguish the casual from the causal,—what is connected simply by arbitrary or contingent association from what is linked together objectively, or in the order of nature.

§ 609. The aim of Inductive Method with Bacon is the search after “Form.” Concrete substances are made up of “simple natures” or qualities—they are “*formæ copulatæ*”; if we can reach the form of the simple nature, we can see how it is produced, and thus proceed to the composition of substances. The forms of substances are, at least, ultimately discoverable. A substance with him means a congeries of qualities. Qualities are “simple natures”; but form is ambiguous. It is taken to mean essence, definition, &c., of a thing, and the cause, hence law, of a thing. Form thus applies to the essential

¹ Franck, *Dict. Phil. Ind.*

qualities of a class, to the attributes of a concrete substance, or to a quality itself.¹

§ 610. As in an object the essential qualities are those upon which certain other or derivative qualities depend—may depend—even as their cause; and as the form of a quality is really the cause of that quality, the two meanings of form come to coincide. The essential qualities, for example, of a triangle or square are given in the definition, and on these all the demonstrated properties depend. The form or cause of heat, to use Bacon's illustration, is motion—a kind of motion. Thus the search after form resolves itself practically into the search after causes. If by cause we understand, as we ought to do, not only what as a determination precedes the effect or consequent in time, but that also which is concomitant with the effect in time, the expression "form" may well take in the whole scope of causal relation as sought for by induction.

§ 611. The essential point of Bacon's inductive Method lies in Exclusion (*Exclusiva*): "Inductio mala est quæ per enumerationem simplicem principia concludit scientiarum, non adhibitis exclusionibus et solutionibus, sive separationibus naturæ debitis."² Again: "Naturam separare debet, per rejections et exclusiones debitas; ac deinde, post negativas tot quot sufficiunt, super affirmativas concludere."³ Again, more particularly, he says: "Est itaque Inductionis veræ opus primum (quatenus ad inveniendas formas) rejectio sive exclusiva naturarum singularum, quæ non inveniuntur in aliqua instantia, ubi natura data adest; aut inveniuntur in aliqua instantia, ubi natura data abest; aut inveniuntur in aliqua instantia crescere, cum natura data decrescat; aut decrescere, cum natura data crescat. Tum vero post rejectionem et exclusivam debitis modis factam, secundo loco (tanquam in fundo) manebit (abeuntibus in fumum opinionibus volatilibus), forma affirmativa, solida, et vera, et bene terminata."⁴

§ 612. As aids to the Method of Exclusion, Bacon gives the three tables—viz.:

(1.) The table of Presence or the appearance (*comparentia*) to the intellect of all known instances, which agree in the

¹ Cf. Fowler, *Nov. Org., Int.*

² *Ibid.*, i. 105; cf. ii. 15, 16, 19.

³ *Nov. Org.*, i. 69.

⁴ *Nov. Org.*, ii. 16; cf. ii. 19.

same nature, although the matter or circumstances are most unlike.

(2.) The table of Absence, or the appearance to the intellect of instances which want the given nature; because the form, as has been said, ought to be not less absent when the given nature is absent, than to be present when it is present.

(3.) The table of Comparison, or the appearance to the intellect of instances in which the nature, regarding which there is inquiry, is present according to greater and less; whether the appearance made be of increment or decrement in the same subject or by turns in diverse subjects. . . . Any nature may not be received for the time as form, unless it uniformly decrease when the nature itself decreases; and, in like manner, is constantly increased when the nature itself is increased.¹

§ 613. After the tables, Bacon proceeds to state certain remaining auxiliaries of the intellect in seeking a true and perfect interpretation of nature and induction. Under this head he gives the first place to "the Prerogatives of Instances" (*Prærogativis Instantiarum*). These are "characteristic phenomena selected from the great miscellaneous mass of facts which occur in nature, and which, by their number, indistinctness, and complication, tend rather to confuse than to direct the mind in its search for causes and general heads of induction."²

§ 614. First among the Prerogative Instances, Bacon places the Solitary Instances (*Instantias Solitarias*). Those are solitary instances, he says, which exhibit the nature concerning which there is inquiry in such subjects as have nothing in common with other subjects, except that nature itself; or again, which do not exhibit the nature regarding which there is inquiry in such subjects as are similar through all with other subjects, except in that very nature itself. It is manifest that instances of this sort remove doubts, and accelerate and strengthen the exclusion; so that a few of these are equivalent to many. This and other examples which follow in illustration, leave but little to make explicit Mill's

¹ *Nov. Org.*, ii. 11, 12, 13.

² Herschel, *Discourse on Study of Natural Philosophy*, § 190. Cf. Fowler, *Nov. Org.*, ii. 21.

methods of agreement and difference.¹ Bacon even speaks of the instances solitary, "quatenus ad similitudinem"; and those solitary, "quatenus ad discrepantiam."² The *Instantiæ Migrantes*, under the Prerogative, readily suggest the method of Concomitant Variations.³

§ 615. Among the Prerogative Instances, Bacon has the Crucial Instance (*Instantia Crucis*). This means an observation or experiment which by its nature definitely settles one or other of two or more hypotheses, or possible antecedents, as the true one. We suppose nothing changed, except a particular antecedent as present or absent; and with this we find the effect in question, present or absent. This readily suggests the method of Difference.⁴

§ 616. The Tables given by Bacon, and other statements, seem to indicate that he supposed science was to be built up, first, by observation of facts arranged as the same or different; secondly, by induction therefrom, giving us laws of more or less generality, the *axiomata media*; and thirdly, from these intermediate laws rising to the highest generalisations. This cannot be taken as the sole mode in which science has progressed since his time; for the element of Deduction, making use of the imperfect or limited generalisation in new spheres, and where the antecedent or cause was not observable, has done most to build up our knowledge of the physical universe. But the method of Bacon did forecast the mode of certain discoveries, and in its reverse form it is that in which the ascertained laws of science are best stated. And its influence as a protest against arbitrary anticipation of the order of nature cannot be overestimated.

§ 617. As has been pointed out by Herschel, Mill, and frequently illustrated by Professor Fowler, Bacon's Method of Exclusions "proceeds on the assumption that every phænomenon has only one cause, that is to say, is due to only one set of conditions. Of the 'simple natures' there is some one, and one only, which, if it could be found, is the 'form' of the *natura data*. But the same event may be due to one set of conditions at one time, and to a different set at another.

¹ *Novum Organum*, ii. 22.

² Cf. Professor Fowler's admirable edition of the *Novum Organum*, p. 409.

³ *Nov. Org.*, ii. 23.

⁴ *Nov. Org.*, ii. 36.

Hence, though it is invariably true that the same cause is always followed by the same effect, the converse proposition that the same effect is always due to the same cause would frequently be misleading." ¹

§ 618. Mill has well analysed the methods of Induction, and gives certain Rules or Canons, which, though open to criticism in expression and details, are in substance those generally received. Mill, in fact, has made explicit what Bacon foreshadowed, and what Herschel had already in the main put more clearly.

The First Method—called the *Method of Agreement*—is thus stated: "If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon;" or, as it has been put,—“the sole invariable antecedent of a phenomenon is probably its cause.” ²

§ 619. In order to make this canon available, the first requisite is ample observation of the circumstances or actual antecedents of the phenomenon in question. When we find among those antecedent circumstances that there are some whose presence or absence does not affect the actual occurrence of the phenomenon or event,—we infer that these are not essential to it; in a word, that they are casual not causal. If, however, we be able to find an antecedent, either one circumstance or sum of circumstances, which alone invariably precedes or accompanies the phenomenon, we are entitled to infer with probability that that is the cause, or that the phenomenon depends on it as effect. But we ought to observe in regard to this method, that all which it tells us is simply that the antecedent is the cause in the given circumstances; in other words, it is a cause of the effect, but not necessarily the only cause, or the cause at all times and in all circumstances.

§ 620. As has been pointed out by numerous logicians, and in these days emphasised by Mill and others, the same (similar) phenomenon, or event, or effect, may follow from several different causes.

This was the very commonplace of logic and of usual practice ere modern ignorance invested it with the dignity of a

¹ Fowler, *Nov. Org., Int.*, p. 62.

² Jevons, *Logic*, 241.

discovery. Even Roger Bacon taught it, as common-sense had forestalled him.

Electricity, for example, may be excited by friction, cleavage, pressure, change of temperature, motion of the magnet, &c. Supposing, therefore, that electricity as an effect is present in different times and circumstances, it does not follow that this particular antecedent, which is a known cause of it, is the actual cause in each of the instances. One of the other causes may be in operation. But if we find one antecedent constantly present when the phenomenon occurs, and constantly absent when the phenomenon does not occur, there being no other change in the circumstances, we may infer that that antecedent is the cause of the phenomenon in question.¹

Hence the need of the second Rule or Canon—the *Method of Difference*. It is thus stated: "If an instance in which the phenomenon under investigation occurs, and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former,—the circumstance in which alone the two instances differ, is the effect or the cause, or an indispensable part of the cause, of the phenomenon."

"We learn," says Jevons, "that sodium or any of its compounds produces a spectrum having a bright yellow double line, by noticing that there is no such line in the spectrum of light when sodium is not present, but that if the smallest quantity of sodium be thrown into the flame or other source of light, the bright yellow line instantly appears."²

A dead body is found floating in the river. We might infer at once that drowning, or suffocation through drowning, was the cause of death. This would be simply on the Method of Agreement. This would be a sufficient cause, and it is (possibly) present. But suppose we find a sword-wound in the body, obviously dealt while living, sufficient to cause death, we should at once attribute the death or event to another cause or antecedent. Here the circumstance in which the two cases differ is the cause.

We find, for example, that electricity can be produced by friction; and seeing that the body thus electrified loses its electricity after a time, when the friction has ceased, we

¹ Cf. Jevons, *Logic*, p. 242.

² *Logic*, p. 243.

prove that this was the cause, as by renewing the friction we again electrify the body. Here we have, first, the presence of the antecedent, then its absence and the absence of the consequent; we have the renewed presence of the antecedent and the renewed appearance of the consequent.

This is the great Canon of Experiment, and of what may be called Concentrated or Exclusive Observation.

We ask what, among other concomitant circumstances, is the cause, or at least indispensable condition of life in the animal? We isolate one known circumstance,—we withdraw from the breathable atmosphere one of its elements—oxygen—and the animal speedily dies. Oxygen is thus proved indispensable to life.

In order to test the effect or consequents of a particular cause, the essential preliminary is its isolation as far as possible from the concomitant circumstances, or placing it in a position where its specific action can be definitely ascertained. It is thus only we can truly study its proper or specific effects.

Of this Pascal's well-known experiment on the column of mercury in the Torricellian tube may be given as a good illustration. It was surmised that the column of mercury in the tube was sustained or counterpoised by the weight of the air. Is this so? was the question. Pascal argued if it be so, when the weight of the air is diminished, the mercury ought to stand lower. On carrying the mercury in the tube up the mountain—the Puy de Dôme,—“the weight of the incumbent air was diminished, because a shorter column of air was to be sustained; the mercury in the barometer ought to sink, and it was found to do so accordingly.”¹ This experiment proceeded on a certain isolation of the main circumstance, and it may be taken also as illustrating the Method of Concomitant Variations. Bacon would probably have called it an *Instantia Migrans*.

§ 621. Mill's third canon is the *Joint Method of Agreement and Difference*. It is thus expressed: “If two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more circumstances in which it does not occur have nothing in common save the absence of that circumstance,—the circumstance in which alone

¹ See Playfair, *Prel. Diss. En. Brit.*

the two sets of instances (always or invariably) differ is the effect or the cause, or an indispensable part of the cause, of the phenomenon." This is the rule, as amended by Jevons.¹

There is a reference in this canon to those cases in which the effect is present, and also to those cases in which the effect is absent. This is virtually a union of Bacon's two tables—*Presentiæ* and *Absentiæ*.

§ 622. By a cause we ought not to understand merely a single antecedent. As a rule the cause of a phenomenon is itself a sum of phenomena or antecedents. The cause, in fact, is made up of con-causes or conditions, all acting together, and producing a definite effect. Now there are cases in which the resultant effect is wholly different in kind from that which would follow from each of the con-causes, supposing them to act separately. Thus oxygen and hydrogen together produce water, but neither of them would produce it by itself. And so generally of chemical combinations. The man, the gun, the shot, the powder, the percussion-cap together, produce a result which neither of them has separately. But it may happen that the total effect is of the same kind as that which would be produced by each of the antecedents taken singly, though probably less in degree or quantity. The result, as it has been phrased, is *homogeneous*. Thus, to borrow an illustration, friction, combustion, compression, &c., all in operation at one time will produce the same common effect—heat. The cuirassier and his armour will both result in weight for the horse. The question thus arises how, in such instances, we are to determine what or how much of the joint common effect is due to each con-cause? How are we to find the proportionate result? In order to this, we must know or ascertain the amount due to one or more of the con-causes. Mill gives the following direction or rule—called that of the *Method of Residues*. "Subduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents." Thus it would be easy in the instance given to tell the weight which the rider contributed to the sum total, if, knowing that sum, we knew also the weight of the armour.

¹ *Logic*, pp. 245, 246.

In Dynamics, where we are dealing with the sum of a series of forces, we can ascertain the relative degrees *only* by separating the effect of each concomitant force.

In Chemistry this method is constantly employed "to determine the proportional weights of substances which combine together." Thus after an ingenious process, known to chemical analysis, it is found that "88.89 parts by weight of oxygen unite with 11.11 parts of hydrogen to form 100 parts of water."¹

In Astronomy its use is constant. The residual irregularity of Uranus, after deduction had been made of the effects of all known attractions on it, led Adams and Leverrier to the inference of the existence of a planet beyond, and thus to the discovery of Neptune.

It is easier, perhaps, to lay down this rule of induction, like some of the others, than to put it in practice. We may take the effect known in these days as the depression of trade. To this no doubt several causes concur. We have, probably, over-production, excessive competition at home, foreign competition, the appreciation or comparatively higher value of gold, exclusion from foreign markets, the result of sending shoddy exports abroad, &c. ; but it would puzzle most people to tell how much depression is due to each cause. And it does not help us much to ask us to determine, in the first place, through previous induction, how much is due to this or that of the complex causes or con-causes actually in operation.

In the case of a complexity of motives, terminating in a single action, the application of this rule would be exceedingly difficult, if not impossible. The motives or con-causes of the action might be self-interest, fear of consequences, shame of exposure, sense of duty. It is conceivable that any one of these, taken singly, would not have been powerful enough to lead to the action in question ; but all combined might result in the particular action or course of conduct. But how would it be possible in such circumstances to estimate the force of each ? The canon is obviously of use only where the causes are quantitative and capable of separate measurement, or where each cause is known to be related to a definite part of the total effect.

§. 623. But a phenomenon or effect not only depends on a

¹ Cf. Jevons, *Logic*, p. 254 ; Roscoe, *El. Chem.*, p. 38.

certain antecedent or cause, it may depend for its quantity or degree on the quantity or degree of the cause. For precise scientific statement, it is not enough merely to ascertain the uniform antecedent, we must further seek in most cases to ascertain the relation between the degree of the antecedent and that of the effect. This seems to be what Bacon points to in the tables of Comparison or Proportion.

In the case of an effect which admits of more or less of quantity, it is clear that the cause, as more or less, will produce an effect differing in quantity or degree. Effect is always proportioned to cause, and a less degree or quantity is as much effect of its cause, as if that cause were exercised to the full. The degree of temperature which makes water simply warmer, is as much a cause as that which makes it boil. The difference is not in the causal relation, but simply in the degree of it, or in the correlation of the cause and effect. There may be, as Sir John Herschel has put it, "increase or diminution of the effect, with the increased or diminished intensity of the cause, in cases which admit of increase and diminution."

"It is necessary to inquire," says Franck, "whether properties which we have recognised in an individual, in a species, or in a genus, are not produced in different proportions according to different circumstances, and whether these proportions themselves can be led back to a uniform rule. It is thus only that induction can attain the knowledge of laws, and that these laws, in certain cases, can receive the sanction of reasoning and the calculus."

Hence the further canon, as stated by Mill, that of the *Method of Concomitant Variations*: "Whatever phenomenon varies in any manner wherever another phenomenon varies in some particular manner, is either a cause or an effect of that phenomenon, or is connected with it through some fact of causation." The canon as thus put, points to the proof of the cause which variation gives us; but its true value rather lies in the precision of proportion to which the canon contributes.

We have familiar examples of this rule in our ordinary experience. Every time we exert force or pressure, we know that the effect—say the degree of motion of the body on which we act—is determined by the degree of force or pressure

which we put forth. In the case of heat, we find that a body expands, generally speaking, according to the degree of temperature. We find that water grows warm, and finally boils, according to the continuance and increase of the temperature applied to it.

The "waxing" and "waning" of the moon may be taken as a good illustration of the method of Concomitant Variations. Both in the "waxing" and in the "waning," the varying amount of illuminated surface displayed by the moon to a spectator on this globe, depends on and corresponds with the varieties in her motions and positions as receding from or approaching the sun. We have with increase of distance, increase of light, and with decrease of distance, decrease of light. After what is known as "new moon," the moon, from a thin crescent, with the horns turned to the east, grows, as she increases her angular distance from the sun, to a semicircle of light. When the moon, after passing through the "gibbous" stage, reaches the position of 180° in advance of the sun, she appears as full moon, and the whole illuminated disc is visible. From this point, beginning to draw nearer to the sun, she gradually wanes, passing again through the "gibbous" phase to the stage of the last quarter or semicircle of light. Nearing the sun still more, she reassumes the crescent form, with the horns turned to the west, and gradually passes into the darkness of the position of the "new moon." Here you have a series of concomitant variations between the elements of motion, distance, position, on the one hand, and degrees and forms of illumination on the other.

Jevons gives a very good illustration of variations "in the connection which has of late years been shown to exist between the aurora borealis, magnetic storms, and the spots on the sun. It has only in the last thirty or forty years become known that the magnetic compass needle is subject at intervals to very slight but curious movements, and that at the same time there are usually natural currents of electricity produced in telegraph wires, so as to interfere with the transmission of messages. These disturbances are known as magnetic storms, and are often observed to occur when a fine display of the northern or southern lights is taking place in some parts of the earth. Observations during many years have shown that these storms come to their worst at the end

of every eleven years, the maximum taking place about the present year, 1870, and then diminish in intensity until the next period of eleven years has passed. Close observations of the sun during thirty or forty years have shown that the size and number of the dark spots, which are gigantic storms going on upon the sun's surface, increase and decrease exactly at the same periods of time as the magnetic storms upon the earth's surface. No one can doubt, then, that these strange phenomena are connected together, though the mode of the connection is quite unknown. It is now believed that the planets Jupiter, Saturn, Venus, and Mars are the real causes of the disturbances; for it has been shown that an exact correspondence exists between the motions of these planets and the periods of the sun-spots. This is a most remarkable and extensive case of concomitant variations."¹ At the same time, it must be observed that this is a wholly empirical concomitance. We know only that great variations mutually correspond, but we do not see or know the link of connection.

§ 624. Where the relation of Cause and Effect enters into the strictly inductive illation,—that is, truly the valid constitution of the minor premiss, that *some* stands for, or is equal to *all*—Ueberweg has well summed up the rules in operation:—

(1.) "Inductive inference has strict universality when S (the subject) contains the sufficient reason of P (the predicate); and when P is related to S as its only possible cause or *conditio sine qua non*; and, lastly, when S and P are both necessary consequences of a common cause, sufficient for P and the only possible cause of S."

(2.) "Induction leads only to comparative universality, or to rules which may be limited by exceptions, when S is only a single co-operative cause or condition of P; or when, on the other hand, P is not the possible cause of S, or when S and P are consequences of a common cause, but may also result singly under different conditions."²

§ 625. The place of Hypothesis in science and of a limited induction, which comes to be much the same thing, is that of inciting to testing and verification. The question really is,—Does the hypothesis in question—does the limited law I

¹ *Logic*, p. 251.

² *Logic*, p. 486.

have already got by induction—explain the facts,—more of the facts, all of the facts? Does it extend to cases where I cannot observe the cause already in operation, but the results of which seem to be in conformity with this as the cause? What is its probability, its generality? This is frequently to be tested by deduction—Material Deduction. This means taking the conception formulated in the hypothesis, or taking the limited uniformity, and calculating with this as a basis what should happen in certain circumstances, or in a sphere wider than that already embraced by us. This is experimental rather than observational. Newton might apply the conception of gravity to the motion of the moon to discover whether attraction subsisted between it and the earth. Observation of the facts corresponded with the results of the deduction—that is, what ought to be the hypothesis or limited law extended to this new sphere. And so with the moon and the sun. Doubtless this is the way in which science progresses, and this was not a form of method, at least explicitly contemplated by the modern founder of Inductive Method—Lord Bacon. At the same time it is not just to say that Bacon limited scientific method simply to observation and induction from facts and laws of increasing generality. His Prerogative Instances, especially the *Migrantes* and *Crucial*, show how he could look at characteristic facts, and specially select them. Modern Deductive Method is in no way incompatible with Baconianism. Bacon's denunciation of "the anticipation of nature," as opposed to "the interpretation of nature," was eminently sound. In warning men against projecting their mere "conceits" into the course of nature, and thinking they find them there, Bacon did an incalculable service to science. Facts are the first thing—conceptions, hypotheses, modes of explanation may follow. He fully admits the value of hypotheses—that is, of questions to put to nature. The most and best questioning man will be the discoverer in the end, provided he has caution, zeal, application, as Newton had. But testing, verification, deduction are in the end to appear before the bar of Observation; and it is because of the harmony which subsists between the most laborious, the most ingenious deductive results and the facts as tested by observation, that Deduction as a method has its value—in relation, at least, to the

physical universe. We use deduction when we cannot observe the cause, but only suppose it. All the same, the result of the deduction, in order to have any validity, must harmonise with the facts, or supposed effects as observed by us. If Newton showed that there was attraction between the earth and the moon, by reasoning deductively, the criterion of this reasoning was the harmony between the actual motions and positions and the result of the deduction. And so it is in all cases where a conclusion arrived at deductively reaches full verification or certainty; otherwise, the supposition involved is only a probable hypothesis. Of this we have an illustration in the supposition that the brighter parts of the moon consist of mountains. These, in themselves, are beyond direct observation: yet this hypothesis explains certain appearances which those parts present. They are found—(1.) to cast shadows when the sun's rays fall upon them obliquely; (2.) in the interior illuminated border of the moon there are points illuminated before the others, thus showing them to be higher. The hypothesis, thus, of a mountainous surface is rendered highly probable. The facts we observe, are as if there were mountains of a great elevation.

§ 626. The rules of Induction are, as it seems to me, not really by themselves rules of discovery; they are rather rules of guidance and verification or testing in the process of discovery. The discoverer must start with an hypothesis—a question to put to nature or the facts. This is the guiding spirit of investigation: if, with this in his mind, he tests its applicability according to the canons of induction, he will do well either in finding in it a probable solution, or in casting it aside as useless. And, certainly, before he can vindicate his theory to the world, he must show that his hypothesis has fulfilled those conditions.

As to the value of the rules of Induction in the matter of culture, they are wholly secondary as compared with the high abstract training, the precision of logical thinking, the orderliness of thought, the power of consecution, which are developed by the study of Formal or General Logic. Compared to this, their influence is weak and unsteady as is the swaying chaos of fact in the world compared with the grasp of the universal laws which regulate concepts, proposi-

tions, and reasonings. And while in the world of physical phænomena—definite, visible, tangible, or to be reached by microscope or telescope—they are valuable and important, they cannot for a moment be placed on the same high level as those laws which regulate all human thinking in its very essence, its very possibility—form, in fact, the conditions of any concept, any judgment, any reasoning whatever. These are the first things to be studied, and the man who knows not these in their grounds and basis, is, whatever he may know of rules applied to so-called phænomena, a mere empiric.

CHAPTER XXXVI.

QUASI-SYLLOGISMS—EXAMPLE—ARISTOTELIC ENTHYMEME.

§ 627. What is known as Reasoning from Example has an apparent likeness to Analogy. In Example the process is from one particular to another particular, similar to the former. Thus we may say:—

Socrates (a philosopher) was modest; therefore Diogenes (a philosopher) was modest. In this there is really no valid inference—the one particular does not necessarily imply the other.

If, further, we explicate what is apparently involved in the one premiss, we should have *Socrates is modest; therefore all philosophers are modest*, which is a paralogism. We need somehow to connect *modest* and *philosopher* into a universal proposition,—*All philosophers are modest*,—and this is not provided for by the terms of the propositions or data given us.¹ Yet this is typical of the reasoning from Example set forth by Aristotle.

His reasoning from Example (*παράδειγμα*) is really a complex process, consisting (1.) of an inference so-called, from one single case to every case of the same kind; (2.) of a syllogism properly constituted, in which the supposed universal conclusion of the first reasoning becomes the major proposition of the second. Aristotle defines Example as that in which, among three notions, the extreme is affirmed of the middle through a term similar to the third. But we must know, he adds, that the middle is with the third term, and that the first is with the similar term.

¹ Cf. Duncan, *Inst. Log.*, L. iv. c. vii. § 2.

Thus, to take his own illustration, which may be put thus :—

(a) *The war by the Thebans (neighbours) against the Phocians was destructive ;*

Therefore the war by the Athenians (neighbours) against the Thebans will be destructive.

This implies the reasoning—

(b) *The war waged by the Thebans against the Phocians was destructive (Δ is A) ;*

That was a war against neighbours (Δ is B) ;

Therefore every war against neighbours is destructive .
(B is A).

Then we have the following :—

(c) *B is A ;*

Γ is B ;

$\therefore \Gamma$ is A ;

Or—

Every war against neighbours is destructive ;

The war of the Athenians against the Thebans would be a war against neighbours ;

Therefore this war would be destructive.

§ 628. The latter reasoning is perfect ; but the major, *every war against neighbours is destructive*, depends on the preceding reasoning, if it can be called such, which it is not in any proper sense. It may be brought under the head of Imperfect Induction ; but it is a thoroughly weak case. The point to be established, which is not, but is simply assumed or left to be inferred from the nature of the case as known to us, is the connection between the destructiveness of the war and its being between neighbours. As Aristotle himself points out, the reasoning in the former case is really only of rhetorical import or influence—fitted to persuade, but not cogent enough for conviction.

Or, to take another illustration :—

(a) *A (a statesman) is patriotic ;*

Therefore B (a statesman) is patriotic.

This implies the reasoning—

- (b) *A is patriotic ;*
A is a statesman ;
Therefore all statesmen are patriotic.

Hence we reason—

- (c) *All statesmen are patriotic ;*
B is a statesman ;
Therefore B is patriotic. .

The reasoning (b) is obviously a paralogism,—while the reasoning (c) is formally valid; but, as borrowing its major from an unsound reasoning, is materially wrong.

(a) It is evident that Example is not a relation of the whole to the part, nor of the part to the whole; it is the relation of a part to a part, since the two terms are the subjects of one and the same, and that only the one is more known than the other.

Example differs from Induction in this, that the one demonstrates, through all the particular cases, that the extreme is in the middle, and does not bind the syllogism (conclusion) to the other extreme, while example does so, and does not demonstrate through all the particular cases.—(*An. Pr.*, ii. 24.)

(b) Pacius gives this illustration of the difference of Syllogism from Induction and Example:—

(1.) Syllogism—

All war against neighbours is fatal;

The war of the Athenians against the Thebans is a war against neighbours;

Therefore the war of the Athenians against the Thebans will be fatal.

(2.) Induction—

The war of the Thebans against the Phocians, the war of the Athenians against the Thebans, and all similar wars, are fatal; hence all war against neighbours is fatal.

(3.) Example—

The war of the Thebans against the Phocians has been fatal; hence the war of the Athenians against the Thebans will be fatal.

(c) Example is an argument in which some Singular is inferred through one or other similar. Formally, it has no force of probation, because there is no process from one singular to another unless through the universal, which cannot be concluded from the one or the other singular.—(*Duncan, Inst. Log.*, L. iv., c. vii. p. 249.)

§ 629. The inference from one case to another similar is not a necessity but a simple presumption or probability. In a given instance, A^1 has been followed by B^1 ; in another instance A^2 occurring will not necessarily be followed by B^2 .

The presumption is that it may; or, owing to the specific character of the instances, we may be certain that A^2 will be followed by B^2 , as in the case of the elements of a chemical analysis. But there is here no real syllogistic inference as from whole to part, or all parts to whole. Example is but a stage in induction, and is often a good practical rule to act on in the interest of caution and the avoidance of danger. But that is all. It is no doubt the form of reasoning,—if it may be called reasoning,—which appeals most strongly to the average irreflective intellect. The average intelligence seldom rises above process from similar to similar, or from particular to particular. The moment the question is raised, —similar in what, and why is this particular result likely to follow?—we get into the sphere of Induction and the search after causes. At the same time, the presumption on which example is founded often strikes home. When, after the slaughter of King Ahaziah, Jezebel, looking from the window, called out to Jehu—"Had Zimri peace, who slew his master?" the question passed with winged force to the heart of the red-handed Jehu.¹

§ 630. Example may be of use in illustration, though it is not a reasoning. It has, however, semblance enough to inference to pass as such in popular oratory, and even in other departments of literature, as a valid argument. The majority of men are much more ready to catch at and fix on an example as at least convincing or persuasive, than to follow the links of sound argumentation, however clearly stated. The proper use of Example is to lead us to inquire whether the attribute alleged to be predicable of the second subject is really connected with the quality common to both. In some cases there may be a strong presumption that the attribute is connected with the common quality. Thus *A (a Christian) was put to death under Nero, therefore B (a Christian) was put to death under Nero*. If we find that B died in Nero's reign at Rome, and while other Christians were being put to death, the likelihood of his also having been a sufferer is increased. And thus example may be a help to discovery, or, at least, to some form of probability in a doubtful matter.

(a) To allow, as Duncan does, that Example may be valid per

¹ 2 Kings ix. 31.

accidens or by help of the matter is simply to give up the form, as a proper mode of reasoning. Thus, *Plato is by nature risible, therefore so is Socrates*, since the nature of all men is the same. The *by nature* introduces a universal. It is equivalent to *man naturally* or *all man is risible*.—(*Ibid.*)

§ 631. The Enthymeme is a reasoning from likelihood or signs, or from both in the single reasoning. It is unessential to the Enthymeme of Aristotle whether a premiss be suppressed or not, as is the case in the ordinary enthymeme; the reasoning would still be an enthymeme—that is, “of a peculiar matter from signs and likelihood..”

§ 632. Likelihood and Sign (εἰκός δὲ καὶ σημεῖον), says Aristotle, are not the same. The likely is a proposition based on opinion. What people know for the most part as happening or not happening, or being or not being, this is the likely. For example, the envious hate, lovers love. The Sign, on the other hand, tends to be a proposition capable of demonstrating, either necessary or proved by the opinion of men. That which existing implies the existence of another thing, or which having been produced, another thing is implied as produced, before or after,—this is the Sign, indicating that the thing is produced or exists. The Enthymeme, accordingly, is a syllogism from the likely or from signs.¹

(a) The term *incomplete* (ἀτελής ἐξ εἰκότων) is usually added to Syllogism in this definition; but it has no authority, and it has been properly rejected by Pacius, the Berlin editors, St Hilaire, and others.—(Cf. St Hilaire, *in loco.*) The examples of enthymeme given by Aristotle have their two premisses; otherwise there would be nothing to suggest reasoning.

§ 633. Σημεῖον and εἰκός differ as genus and species. Σημεῖον is generally a sign or mark, and it is divided into (1.) a sign necessary and certain, which is called τεκμήριον, as *there is a scar, therefore there was a wound; the mountains cast a shadow, therefore they are illumined*; and (2.) a probable sign (εἰκός) which may sometimes fail, as *he is a soldier, therefore he is renowned*.² In the first case the τεκμήριον is peculiar, and can indicate but the one thing or fact, and in this case it is necessary. In the second case the εἰκός may belong equally to, and thus indicate, several things. The τεκμήριον has the

¹ *An. Pr.*, ii. 27.

² Cf. Duncan, *Inst. Log.*, L. iv. c. vii.

power of demonstration. The cases of this class are, however, rare.¹

§ 634. The true character of the εἰκός is thus a proposition very generally accepted, nearly universal, but not quite so, and such as, if used in a reasoning, would give a probable conclusion, as:—

*Envious men usually hate ;
This man is envious ;
He probably, therefore, hates.*

It is, in fact, a proposition founded on experience, but not satisfying the requirements of sound induction.

§ 635. The Sign, in order to be of use in reasoning by Enthymeme, must be capable of assuming a propositional form, and thus becoming the indication (or sign) of some other truth or fact capable of being propositionally stated. The force of the reasoning must further turn on the relevancy or appropriateness of the sign or significative character of the proposition. "If one proposition should be stated, there is only a sign; but if the other also be assumed, there is a syllogism, as that *Pittacus is liberal, for the ambitious are liberal, and Pittacus is ambitious.*" Thus, *this man's face is yellow, therefore he is suffering from jaundice*, would be an enthymematic relation of two propositions. The argument would be completed by supplying the general proposition. *Whosoever's face is yellow is suffering from jaundice.* But the weakness of the Enthymeme comes out here, for the sign elevated to a general proposition is not identical with a proposition strictly universal, or admitting of no exception. It may be a proposition generally received, but it is not proved to be universal, and hence the peculiar character of the reasoning, arising from a consideration of the matter.²

§ 636. The Sign in the Enthymeme may have the three positions of the middle—(a) subject and predicate, as the middle in the First Figure; (b) predicate of the two extremes, as the middle in the Second Figure; (c) subject of the two extremes, as the middle in the Third Figure.

Thus, First Figure:—

¹ Cf. Trendelenburg *in loco*.

² Cf. Crakanthorpe, Trendelenburg, Waitz, St Hilaire *in loco*.

- (a) (B) (A)
 Any dog which shuns water is mad ;
 (C) (B)
 This dog shuns water ;
 (C) (A)
 Therefore he is mad.

Second Figure :—

- (b) (C) (A)
 Pittacus is a worthy man ;
 (C) (B)
 Pittacus is a wise man ;
 (B) (A)
 Therefore (some) wise are worthy.

Third Figure :—

- (c) (B) (A)
 All mad dogs shun water ;
 (C) (A)
 This dog shuns water ;
 (C) (B)
 Therefore this dog is mad.

§ 637. This sense of the Enthymeme is that constant in Aristotle. But the term has had various meanings assigned to it. Quintilian gives these, among others—(a) signifying all things conceived in the mind ; (b) an opinion (*sententia*) with reason ; (c) a certain form of argument ; (d) *epicheirema* ; (e) rhetorical syllogism ; (f) imperfect or abbreviated syllogism, in which one or more of the propositions of the perfect form are suppressed. This has come to be the prevailing meaning of the term.¹

(a) Aristotle, in the *Topics*, divides syllogisms thus :—

- (1.) *Philosophema*, or Demonstrative Syllogism,—highest and best form.
- (2.) *Epicheirema*, or Dialectical Syllogism.
- (3.) *Sophisma*, or Eristic Syllogism.
- (4.) *Aporema*, or Dialectical Syllogism of Contradiction.—(*Top.*, viii. 11 ; i. 1.)

There is demonstration when the conclusion is from what is true and primary, or from what is based on this as its principle of certainty.

¹ See Trendelenburg, *El. Log.*, § 37.

The dialectical syllogism is that which draws its conclusion from propositions commonly received (simple probabilities). True and primary propositions are held as certain, not through other propositions, but through themselves; for there is no need to investigate the *why* of principles which give us science; but each principle ought to be perfectly credible by itself. That is probable which appears such, either to all men, or to the majority, or to the wise; and among these, either to all or some, either the most illustrious or the most trustworthy.

The Eristic or Contentious Syllogism is that which proceeds on propositions that seem probable, which yet are not so. They are apt for a conclusion, or seem to be so. This is the semblance of a Syllogism. It seems to conclude, but does not.—(*Top.*, i. 1; viii. 12. *Soph. Elench.*, i. 2.)

The equality of contrary reasonings would seem to be that which causes doubt. When in reasoning it appears to us that the reasons are equal on both sides, we doubt which of the two we ought to adopt in action.—(*Top.*, vi. 6.)

CHAPTER XXXVII.

HYPOTHETICAL—DISJUNCTIVE, HYPOTHETICO-DISJUNCTIVE,
FORMS OF REASONING.

§ 638. Besides the Categorical Form of Reasoning, we have others which outwardly differ from it, in being made up of two kinds of propositions—a hypothetical, or disjunctive, along with a categorical premiss. The Hypothetical and the Disjunctive Reasoning cannot, as seems to me, be said to differ essentially from the Categorical. For the laws which regulate them are the same in all the cases—viz., those of Identity, Non-Contradiction, and Excluded Middle. The law of Reason and Consequent is in its relation to Hypothetical and Disjunctive Reasonings only an application of those other laws—it is, in fact, those laws in motion. At the same time, the law of Reason and Consequent should not be excluded from Logic, as a special expression of those laws, and also as a general postulate which requires us to think always with a reason in some form.

§ 639. The Hypothetical, Conditional, or Conjunctive Syllogism has for its major premiss a hypothetical judgment, which enounces the connection between a reason and consequent, or condition and conditioned. This premiss has nothing to do meanwhile with the question of the actual or isolated reality of the condition or conditioned. It states only that between the antecedent and the consequent there is such a connection that if the one is, the other is also. Thus, *if A is, B is; or, A being given, B is also given. If the sun is up, it is day.* This is the major premiss or sumption of the reasoning,—and the whole reasoning turns on the connection or sequence between the terms.

The major being given, we may proceed (a) to the categorical affirmation of the Antecedent or Condition, and thus necessarily reach an affirmative conclusion. • Thus :—

*If A is, B is ;
But A is ;
Therefore B is.*

*If the sun is up, it is day ;
But the sun is up ;
Therefore it is day.*

Or—

If there be no difference in weight between a given quantity of water and the ice or the steam into which it may be converted, then the heat which is added to or taken from the water to give rise to these several states possesses no weight. But there is no difference, &c., therefore heat possesses no weight.¹

This is known as the Constructive Hypothetical, or as the *modus ponens*.

Or (b) we may proceed to the categorical denial of the Consequent or Conditioned, and thence backwards to the denial of the Antecedent or Condition. Thus :—

*If A is, B is ;
But B is not ;
Therefore A is not.*

*If the sun is up, it is day ;
But it is not day ;
Therefore the sun is not up.*

This is the Destructive Hypothetical or *modus tollens*.

"In Hypotheticals, the reason or antecedent means the *condition*, that is, the complement of all without which something else would not be ; and the consequent means the *conditioned*, that is, the complement of all that is determined to be by the existence of something else."²

§ 640. The rules of these two forms have been given thus :—*Posita conditione ponitur conditionatum ; sublato conditionato, tollitur conditio.*

The special rules commonly given for the Hypothetical Syllogism are (1.) the major or Sumption is always Definite

¹ Huxley.

² Hamilton, *Logic*, L. xviii., ill. p. 356.

in quantity, and Affirmative in quality; the Subsumption may vary in these respects.

(2.) The conclusion is regulated by that member of the major which is not subsumed in the minor.

It should be explained that by affirmative as applied to the major or hypothetical premiss, it means simply the assertion of the relation of dependence between antecedent and consequent. Further, quantity in the antecedent in the major only comes into account in some cases,—as from genus to species,—but not properly from mark to mark.

§ 641. According to the common view, thus, we can conclude from the truth of the antecedent to the truth of the consequent, or from the falsehood of the consequent to the falsehood of the antecedent. But we cannot validly reverse those processes. (1.) Thus, to take the first case, we cannot conclude from the truth of the consequent to the truth of the antecedent—

*If A is, B is ;
But B is ;
Therefore A is. "*

The fact of B does not give the fact of A, for B may depend on other facts besides A. We have not said in our major, A is the only antecedent on which B depends; and therefore supposing we find B to be, it does not follow that A is. Or, concretely—

*If X made that statement, he is foolish
But X is foolish ;
Therefore he made the statement.*

This by no means follows from the datum.

(2.) To take the second case :—

*If X made the statement, he is foolish ;
But X did not make the statement ;
Therefore he is not foolish.*

This does not follow from the datum, for we only asserted a connection between *making the statement* and being *foolish*, and as X is disconnected from the condition, we cannot say either that he is foolish or that he is not,—so far as our data are concerned.

(a) These are the two direct forms of the principle of what is known as the Sufficient Reason; and these indicate its sphere as a logical principle.

Looked at as bearing on truth,—truth of fact,—this law has two important applications—as Kant puts them :

“(1.) The truth of the *consequent* yields negatively only the truth of the *principle* or *reason*. If a false consequent follows from a principle, this principle is false. For if the principle were true, equally ought the consequent to be true, the consequent being determined by the principle. But the converse does not hold,—that if from a principle false consequences did not flow, that principle would be true; for true consequents may follow from a false principle.

“(2.) If all the consequents of a principle be true, this principle is itself true; for if the principle were false in any respect, some false consequence would follow.

“The first mode of inferring that which gives only a sufficient negative and indirect criterion of the truth of a principle, is called the *apagogical* (*modus tollens*). This mode is applicable in geometry, and enables us to demonstrate the falsity of a principle by this alone, that a false consequent follows from it. *E.g.*, if the earth be flat, the polar star ought always to appear at the same height; but this is not so; therefore, the earth is not flat.

“The second mode of inference, *positive and direct* (*modus ponens*), cannot recognise apodictically the universality of the consequents, and is thus only led to a probable and hypothetically true conclusion, by the supposition that if several consequents be true, all the others are equally so” (Kant, *Logik*, *Int.*).

§ 642. But, as seems to me, we may in Hypothetical Reasoning have a form in which the consequent is dependent on a single antecedent, and where, consequently, we may proceed from the truth of the consequent to the truth of the antecedent, and from the falsehood of the antecedent to the falsehood of the consequent. Thus—

- (a) *If education is good, it both develops and informs the mind;
But this education both develops and informs the mind;
Therefore this education is good.*

Or—

- (b) *This education is not good;
Therefore it does not develop and inform the mind.*

Or, *If the sun, earth, and moon are in a straight line (that of syzygies), and the earth is between the sun and moon, the whole of the illuminated face of the moon may be seen from the earth.*

This is true whether we affirm the antecedent or the consequent, because the antecedent is sole cause. Equally we may say, *If the moon be in the line of syzygies with the earth and sun, and between the earth and sun, no part of her disc can be seen from the earth.* This is equally valid whether we affirm antecedent or consequent, and for the same reason.

The force of the inference here depends on the convertibility of the sphere of the antecedent and the consequent. The consequent here is really given as dependent on one antecedent, and hence we can proceed indifferently from one to other, either by affirmation or negation.

Again, we may have perfect equivalence in the spheres, although the relationship of the terms is reversed. Thus—

*If A is the son of B, B is the father of A;
But B is the father of A;
Therefore A is the son of B.*

Or—

A is not the son of B, therefore B is not the father of A.

§ 643. And even in regard to those cases in which the spheres of the antecedent and consequent are not convertible, the reasoning in the form of the *modus tollens* may fairly be reduced to the same formula. Thus: from the falsehood of the antecedent:—

*If X made the statement in question, he is foolish;
But he did not make the statement in question;
Therefore (so far as our datum goes) he is not foolish—i.e., not proved foolish, or not the fool this would make him.*

This is virtually saying there is no proved connection sufficient to found the conclusion that he belongs to the class foolish.

But in no case of this sort could we conclude from the truth of the consequent to the truth of the antecedent:—

*If X made the statement in question, he is foolish;
But he is foolish;
Therefore he made the statement in question.*

Here the converse process is not legitimate, whether we regard *foolish* as taken extensively or comprehensively.

From the fact of a man belonging to a class, it does not follow that he commits or has committed a given or definite action characteristic of the class.

If man is, animal is.—Let this be quantified :

- *If (all) man is, (some) animal is ;*
- *But some animal is ;*
- Therefore all man is.*

No—for the *some animal* of the minor may not be *the some animal* of the major. We should need to say *this some animal is*.

(a) The property is a reciprocal attribution to the subject ; the genus is not. *Animal is, therefore man is*, does not follow. *Animal is, therefore risibility is*, does not follow. But *man is, therefore risible is ; risible is, therefore man is.*—(Porphyry, *Isagoge*, ix. 6.)

§ 644. The Hypothetical is obviously a useful and much needed form of reasoning. We frequently know that if one event takes place, another certainly will follow. Thus an astronomer might be able to tell us that if the moon has always the same face to the earth, it has no diurnal revolution on its axis. These two things may be known to be essentially connected ; yet I may not be able from imperfect observation to say absolutely that either is so. But as soon as I am able to affirm the antecedent part of the proposition, and to say the moon has always the same face to the earth, I can conclude to the consequent in the form of the hypothetical reasoning, that the moon has no diurnal revolution on its axis. This enables us to extend our knowledge ; for we thus connect what is within our observation with what may be beyond it,—as the physician may connect an observed symptom with an unobservable poison in the system of the patient.

§ 645. There is in appearance a more complex form of the Hypothetical reasoning, in which seemingly there are four terms. Thus :—

If A is B, C is D ;
But A is B ;
Therefore C is D.

Or -

*If the rains be heavy, the river will be full
But the rains have been heavy ;
Therefore the river is flooded.*

There is, however, no real difference here between this and the apparently simpler form. There are more terms, taken isolatedly, in the antecedent and in the consequent; but the point of the whole is as simple as in the form in which there are only two terms—antecedent and consequent. For what is asserted is a certain connection between the antecedent as a whole and the consequent as a whole. This is in no way affected by the seeming complexity, either of antecedent or consequent. The same rules and the same remarks apply to this as to the other form.

§ 446. It may be said that, as in Hypothetical Reasoning there are but antecedent and consequent, there are only two terms, and the inference is, therefore, not mediate, but immediate. But on the other hand, it may be urged that the minor premiss really supplies a new term. When we say, *if the sun shines, it is day*, we merely state a general or universal fact or law. When we categorically add, *the sun does shine, or does now shine*, we have made a new statement—a statement coming under the general rule, no doubt, but still specifically distinct and definite. It is a new proposition, or new matter of fact. And it is through this minor alone that we can apply the connection stated in the major to the consequent in the conclusion. The mere hypothesis of the major is *per se* powerless for inference.

(a) Hamilton's final view may perhaps be stated as follows:—Taking Conditional as the genus, he includes under it Conjunctive (Hypothetical) and Disjunctive. In either form, however, there is no reaching a conclusion through a middle term. There is thus no mediate inference, or reasoning syllogistically. The so-called major premiss in either form is not properly a major premiss. There is but one premiss; and all that it does is to state a relation or dependence between the judgments or propositions. *If A is, C is, or if A is B, C is D.* You have but to apply the rule of the Condition and Conditioned. This granted, —affirm the condition (or antecedent), and you affirm the consequent. Deny the consequent, you deny the antecedent or condition. We do not need to go beyond the given relation or dependence, we do not need another term or proposition, in addition. We have only to apply the rule of inference to what we have—in a word, the inference is imme-

diate. And it belongs to what may be called **Explicative Inference**. "Given two or more propositions; related and conditionally,—what are the inferences which the relative propositions, explicated under these conditions, afford?"—(*Logic*, iv. p. 371. *Appendix viii.*)

The **Conjunctive**, properly stated, is:—*As B, so A; or as B is, so is A; or as C is B, so is B A.* This is the **Explicand**; then follows the **Explicative proposition**,—*B is*; then the **Explicate**, *A is*. Thus:—

If B is C, A is B,—

Explicated thus,—*The cases of B being C, are cases of A being B. Therefore, this case of B being C is a case of A being B.*

If the rock is metamorphosed, it has been subjected to heat.

Every case of a rock being metamorphosed, is a case of having been subjected to heat.

This case of a rock being metamorphosed (hypersthene), is a case of having been subjected to heat.

If any A is, B is;

This A is, B is.

I venture to think that conjunctive (or hypothetical) reasoning, and disjunctive as well, are not reducible to mere explication of the so-called major premiss. Explication of what is conditional, can never go beyond stating the condition in a particular form. But as thus stated, it is still conditioned. We do not reach any categorical result or conclusion.

Thus:—

If rain has fallen, the ground is wet;

But rain has fallen, therefore the ground is wet.

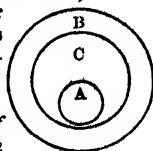
Is this a mere explication of the dependence between the condition and conditioned of the premiss? When it is said *rain has fallen*, this is a new statement or proposition, not evolved out of the conjunctive premiss. It is in fact a particular instance, which is brought under a general rule. This is a very different thing from saying, supposing rain falls on a particular occasion, that will be a case of the ground being wet. This would be an immediate inference from the conjunctive premiss. But the categorical statement is not at all implied in this premiss. And on the categorical statement rests the whole efficacy of the reasoning. In fact, the conjunctive premiss may be taken as the statement of a law of nature, gained somehow or other; and the minor or categorical premiss is the reference of an actual instance to the general law.

Whenever rain falls, the ground is wet;

The case of rain falling is the case of the ground being wet;

Suppose there is a case of rain falling, then there is a case of the ground being wet.

This is obviously an immediate inference; it merely says this would be a particular instance of a general relation between two things,



provided that relation were granted or existed. But it is idle and tautological.

But suppose we say—*rain has fallen (to-day)*; hence *the ground is wet*. Here we go beyond supposition or hypothesis; and categorically assert. In this case we practically introduce new terms,—terms of fact,—as opposed to terms of mere concept. And the true force of the Conjunctive Conditional lies here. It helps us to apply our general knowledge to new or particular instances, which otherwise we could not have done. This is a very different thing from mere explication,—which, as applied to a conditional (or hypothetical) reasoning, must always remain conditional (or hypothetical).

§ 647. The true view of the Hypothetical or Conjunctive Reasoning seems to me to be that it is of three special kinds,—regulated by principles which are in a manner different, but which may yet be held as coalescing under the head of the Sufficient Reason. In the first place, the hypothetical or conjunctive premiss may state the relation of whole or part; and thus the *nexus* or connection of antecedent and consequent may be based on this relation,—on, in fact, the Law of Identity. Thus, *if all A is a part of B, C (a part of A) is D (a part of B)*. This connection is wholly analytic, and it is governed by the law of whole and part—of genus and species. Explicitly stated, it would run :—

As the notion (genus) animal contains the notion (species) man, this man (or the man we speak of) is animal; or If every tyrant is worthy of death, Nero (a tyrant) is worthy of death.

We suppose *Nero* to be part of the class *tyrant*, and consequently that what is applicable to the whole is applicable to the part.

§ 648. In the second place the hypothetical premiss may state the relation of Cause and Effect,—this in thought becoming reason and consequent. In this case, the reasoning fully evolved is synthetical, and states the relation between two facts (or concepts) known only through experience, not implied in the concepts employed. Thus :—

If rain should fall for four hours in the west, this river will be flooded;

But rain has so fallen;

Therefore this river is flooded.

The connection here between the antecedent and the con-

sequent in the major depends on observation and generalisation, which have enabled us to reach a cause upon which a general or universal consequent depends.

§ 649. In the third place, we may have the connection in the major between antecedent and consequent determined through the relation of the sign and the thing signified. Thus :—

*If the barometer falls, rain will fall ;
But the barometer has fallen ;
Therefore rain will fall.*

Here the falling of the barometer is not the cause of the rain falling, but the indication or sign. It is the reason why we believe that the other event will follow.

§ 650. The truth seems to be in regard to Hypotheticals, that the reasoning runs naturally in comprehension ; it is a reasoning through marks or attributes of the subject, rather than through the quantity of the subject. It proceeds on the principle that a mark of the mark is a mark of the subject itself. Thus :—

*If education is good, it informs and develops the mind ;
But this education is good ;
Therefore it informs and develops the mind.*

Here *good* is the mark of education ; *informing and developing the mind* is the mark of *good* ; and hence it is the mark of *this education*. This is a simple, natural, and easy form of reasoning. It amounts to this, that when an individual object is found to possess a particular attribute, we are warranted to refer to it any attribute essential to that attribute. In observational science, as in the study of bodily and mental characteristics, we shall find this formula of the greatest use, provided we are careful to ascertain the essential connection of the marks with each other. The physician knows that a certain mark (antecedent) indicates a certain disease (consequent) ; and finding the mark present in a given subject, he infers the disease—say *poisoning* from *tetanus*. This is simply an unconscious hypothetical reasoning in comprehension. The application of the principle no doubt requires great caution, and this depends on the observer. We must be careful to ascertain that the mark (or antecedent) is either exclusively or at least conclusively connected with the consequent,

otherwise we have no true mark of the mark. Spasm and rigidity of muscle may, for example, be a mark of other things besides poisoning, as epilepsy. We must therefore, if we can, ascertain the special feature of rigidity which indicates poisoning. Otherwise our inference might be made from an insufficient mark. But all this is a matter of experience and analysis prior to the actual inference. It is, in fact, an application of Induction.

§ 651. It is by this method that physical science, in so far as observational and generalising, has progressed since the time of Bacon. For the principle is truly synthetic; it involves an addition to our conception of any given fact or thing. We add to our thoughts of things by finding that other thoughts or other things are essentially connected with them. But for this, we should go on merely making explicit, by analysis and deduction, our received or supposed knowledge. When we add fact to fact, we get beyond the mere analytic judgment, and progress by synthesis or a true addition to our experimental knowledge.

§ 652. But whatever be the ground on which the connection between antecedent and consequent be established—whether that of genus and species, or of cause and effect, or of sign and thing signified, or mark of the mark,—the connection itself is only of one kind for the logician. It is given as that of condition and conditioned, determining and determined, or as Reason and Consequent. The antecedent or reason—one concept or proposition—is given as that upon which another concept or proposition is to be thought as dependent, and necessarily dependent, in whatever way we may have come to know this dependency, and after this the rules of the reasoning are purely formal, and applicable in all matter and under every form of connection. The formula really is:—*Think this, and you must think that.*

(a) There is some controversy as to whether Aristotle recognised hypothetical syllogism in the modern sense of the phrase. "It is not necessary," he says, "further to analyse hypothetical syllogisms, for it cannot be done with the initial data, since they conclude not by syllogism, but only in consequence of convention admitted on both sides" (*An. Pr.*, i. 44). "We suppose that if such a thing is demonstrated, such another will be equally so. Thus, if contraries have one and the same quality, the notion of contraries will be single—that is, it will be a knowledge in one and the same time. Hence, this being posited, we

prove, by an ostensive syllogism, that certain contraries have not one and the same quality, and taking for middle term the contraries *salubrious* and *insalubrious*, we demonstrate that they have different qualities. Thus:—*The salubrious and the insalubrious have not the same qualities, but the salubrious and the insalubrious are contraries, therefore some contraries have not the same qualities.* The supposition has been proved, and by that alone, according to the convention, the principal conclusion is also proved;—*the concept of contraries is not single.* But this demonstration does not result from a syllogism; it results only from the hypothesis; and it cannot be reduced to any figure by analysis. We might further prove the major,—*the salubrious and the insalubrious have not the same qualities,*—by reduction to the absurd; for the contradictory would lead to this conclusion, evidently inadmissible, that *the salubrious and the insalubrious are identical.* The initial proposition would then be true.”—(St Hilaire, *in loco*.)

Hamilton holds that Aristotle did not recognise as syllogism the later hypothetical reasoning. In one place (*An. Pr.*, i. 32, § 5) Aristotle describes the process of the Hypothetic Syllogism (that called by Alexander *δι' ἑλων*), but denies it to be a syllogism. His syllogisms from hypothesis are therefore different. Thus, if *man* existing, it be necessary that *animal* exist, and if *animal*, that *substance*; *man* existing, it is necessary that *substance* exist; but this, though necessary, is not syllogism. Hamilton further points out that, in Aristotle's view, *Thesis* or *Position* is the genus opposed to *Axiom*, and contains under it, as species, *Hypothesis* or *Supposition* and *Definition*. “Hypothesis is that thesis which assumes one or other alternative by a contradiction. Definition is that thesis which neither affirms nor denies. Hypothetical is thus that which affirms or denies one alternative or other,—which is not possibly either, and, consequently, includes both. They are thus, as complete, neither propositions nor syllogisms, as not affirming one alternative to the exclusion of the other.”—(*Logic*, iv. p. 388.)

Pacius, St Hilaire, and Prantl, again, hold that Aristotle recognised the later Hypothetical Syllogism. Ammonius Hermæus is strong on the other side (see *In De Int.*, p. 3, ed. Ald. 1546, quoted in Hamilton, *Logic*, iv. p. 388; see the other authorities there referred to).

Ueberweg holds that “Aristotle did not formally comprehend, under his notion of inferences, *ἐξ ὑποθέσεως*, hypothetical inferences in the later sense. He reckoned indirect proof among the syllogisms hypothetical, in this sense,—*τοῦ ἐξ ὑποθέσεως μέρος τὸ διὰ τοῦ ἀδυνάτου*,—because in it a false proposition—viz., the contradictory opposite of the proposition to be proved—is hypothetically taken as true, and so serves as an *ὑπόθεσις*, and forms the basis of a syllogism, by means of which something evidently untrue is inferred.”—(*Logic*, p. 449.)

Theophrastus developed more fully hypothetical inference; still, however, giving special attention to the hypothetical character in the three propositions (*οἱ διὰ τριῶν ὑποθετικοί*). Thus, if *A* is, *B* is; if *B* is, *Γ* is; therefore if *A* is, *Γ* is. He and Eudemus, however, admitted as hypothetical reasonings those with a categorical minor, and through them these forms have come into *Logic*. Theophrastus laboured, as

other logicians have done since, to reduce to or find parallels for the hypothetical forms in the categoricals of the figures. There is neither need nor use for the reduction of hypotheticals to the categorical form. The essence of the hypothetical judgment is a statement of the relation of connection and dependence of predicate on subject. This can be regulated directly by a law of thinking,—is as direct and cogent as any categorical form. And every disjunctive judgment is immediately regulated by the law of Excluded Middle.

§ 653. A Disjunctive Syllogism is a reasoning in which the major premiss is a disjunctive proposition, and according to the common doctrine, either of Contradiction or of Contrariety. Thus, *A is either B or not B; A is either B or C or D.* The force of the disjunctive proposition is to state and exhaust a totality, or total conception, so that while each of the concepts constituting the totality is possibly predicable of the subject, one or other of them is necessarily predicable. In order to constitute a reasoning with such a proposition as a major, we must have a minor premiss which is categorical. This either (a) affirms one of the possible predicates, and thus the conclusion will deny the other or others; or (b) it denies one or more of them, and thus the conclusion must determinately affirm the other, or indeterminately affirm the others. Thus, to take the first case—affirmative—or *Modus ponens*, or *Modus ponendo tollens*,—

Contradictory Disjunction:—

- (a) *A is either B or not-B (i.e., C);*
A is B;
Therefore it is not not-B (i.e., C).

The world is either eternal or non-eternal (i.e., had a beginning in time);

The world had a beginning in time;

Therefore it is not eternal.

- (b) *Modus tollens or tollendo ponens*:—

A is either B or not-B (i.e., C);
A is not B;
Therefore A is not not-B (i.e., C).

A is either a slave or he is dead;

A is not a slave;

Therefore he is dead.

*This tree is either deciduous or non-deciduous ;
 It belongs to the non-deciduous ;
 Therefore it is not a deciduous.*

§ 654. This is the simplest or barest form of Disjunctive Inference, and it ought to be noted regarding this and every other form of it, that its essential feature lies in the actual or assumed opposition among the possible predicates,—this being the point upon which the whole force of the conclusion depends. It is not enough to state a disjunctive proposition as major premiss. This may give rise merely to a categorical reasoning, according to treatment. Thus we may say :—

The men taken are either in a state of captivity or they are dead ;

B was one of those taken ;

Therefore B is either a captive or dead.

The minor premiss makes no reference to the mutual exclusion or opposition of the possible predicates ; the conclusion, therefore, does not turn on this ; and the reasoning is thus simply a categorical one with an indeterminate predicate. As the form of a disjunctive lies in the statement of an alternative, the conclusion from it must turn on the alternative exclusion.

§ 655. The principle which regulates disjunctive reasoning is the law of Excluded Middle, or that which provides that between two contradictory extremes there is no third conceivable ; and consequently, if the one be posited, the other is negated, and if the one be negated, the other is posited. This applies obviously, in the first place, to simple disjunction, or the opposition of two contradictory terms, whether these be positive and negative, or two positives—as *B and not-B*, or *B and C*. This law will be found to apply even to the more complex case in which there are more than two opposing predicates—as *A is either B or C or D*. This is in reality a complex disjunctive proposition. When analysed it means—

- (a) *A is either B or not B (i.e., C or D) ;*
- (b) *A is either C or not C (i.e., B or D) ;*
- (c) *A is either D or not D (i.e., either B or C).*

In a concrete example—

A is either a lime, a plane, or an elm.

This means—

- (a) *A is either a lime or not (i.e., a plane or elm).*
- (b) *A is either a plane or not (i.e., a lime or elm).*
- (c) *A is either an elm or not (i.e., a lime or a plane).*

Or—

The world is either eternal, or the work of intelligence, or the work of chance.

This means—

- (a) *The world is either eternal or non-eternal.*
- (b) *The non-eternal (i.e., what commences) is either the work of the intelligent or the non-intelligent (i.e., chance).*

The same analysis applies to the form, *either A is B, or C is D*. The one cannot coexist with the other, or be thought as coexisting.

§ 656. In those cases in which we have only two disjunct members, it may be questioned whether, when the minor premiss is negative, there is properly a mediate reasoning at all. When we say—

This tree is either deciduous or non-deciduous,

and then say it is *non-deciduous*, or belongs to the class of non-deciduous, we have said *it is not a deciduous tree*, in other words. There is really no progress to a conclusion here, but simply a statement in a positive form of what we have stated in a negative way. So equally when the minor premiss is affirmative, as—

*This tree is either deciduous or non-deciduous ;
It is deciduous.*

This implies that it is *not non-deciduous* ; but to state this in the form of a third proposition is really no advance in thought on the minor premiss, but simply putting the minor itself in other words. Such reasonings may fairly be regarded as forms of Immediate Inference. The term and its contradictory opposite may be regarded, not as two terms, but as two aspects of the same notion.

§ 657. In cases where the opposing predicates are more

than two, we have Contrary Disjunction—in other words, we have predicates generally of the same class opposed on the ground of subordinate differences. Thus: *A is either B or C or D. The colour is either blue, or red, or yellow. The tree is either maple, or ash, or birch.*

Here the forms are as follow. In the *modus ponens* we have—

(a) *A is either B or C or D ;*
A is B ;
Therefore A is neither C nor D.

(b) *A is either B or C or D ;*
A is either B or C ;
Therefore it is not D.

This rock is either sedimentary, or organic, or igneous ;
It is sedimentary ;
Therefore it is neither organic nor igneous.

In the *modus tollens* we have—

(a) *A is either B or C or D ;*
A is not B ;
Therefore A is either C or D.

Or—

(b) *A is either B or C or D ;*
A is neither B nor C ;
Therefore A is D.

Sedimentary rock consists either of gravel, sand, or mud ;
This sedimentary rock does not consist of gravel ;
Therefore it consists either of sand or mud.

§ 658. The rules usually given for the Disjunctive Syllogism are: (1.) It must have three terms and three propositions. (2.) The major is always uniform, being universal and affirmative. (3.) The minor premiss may be of any form, —that is, universal or particular, affirmative or negative. (4.) The conclusion follows the minor in quantity, and is opposed to it in quality.¹

¹ Cf. Esser, *Logik*, § 95 ; Krug, *Logik*, § 86 ; and Hamilton, *Logic*, iii. pp. 332, 333.

(a) Mark Duncan, in this case not showing his usual precision and grasp of principle, holds that the *modus ponens* or the position of the one part to the sublation of the other fails, or is inadmissible in Disjunctive Reasoning. In this he has been followed by other logicians,—among whom we are to reckon substantially Mill and Jevons—the latter at least in principle. Duncan's ground, moreover, is exactly the ground adopted by those following him. It is this, that there are disjunctions which are not exclusive. Thus, *the highwayman lies in wait either for your life or for your purse. Upright conduct secures for a man either the esteem of his fellow-men or the favour of Deity.* Posit the one of these, it is said, and you do not therefore deny or sublate the other. Of course not. As a matter of fact, the highwayman will not scruple, in certain circumstances, to take both life and purse; and the esteem of men is quite compatible with the favour of Deity. But what then? All that can be said is, there is a blunder in stating such things as alternatives. The whole presupposition of Disjunctive Reasoning is alternation,—the opposition of alternatives. It does not say that anything any one chooses to say is opposed, is actually opposed. With this it has nothing whatever to do. What it says is, that if you give certain alternatives,—certain opposites,—you can deal with them,—you must deal with them according to the laws of Excluded Middle. It would be just as reasonable to object to the law regulating Categorical Inference, that you might put as a whole or genus that which is not so, and so wrongly include something under it as a species, or make a mistake about a certain genus and species.

(b) Mill has a remarkable criticism of the disjunctive proposition and reasoning. He says gravely, “*X is either a man or brute is not a judgment founded on the principle of Excluded Middle, since brute is not a bare negation of man, but includes the positive attribute of being an animal, which X may possibly not be.*” So far as the logician is concerned,—so far as the Principle of Excluded Middle is concerned,—nothing is known or can be known of X beyond what is stated or given in the proposition. This is, that X either has the qualities of man, which are more than those of brute, or the qualities of brute, which are less than those of man. X is one or other, not both,—that is all that is stated or known about X—all that is given in the proposition; and Logic as a science can take cognisance of nothing more. It knows nothing of possibilities,—especially possibilities retained in the mind. Nor can any one with a correct insight into what inference implies go beyond this. The terms here are given as materially and formally opposed, and that is the whole point at issue. Let X possibly not be *animal*, what then? What has that to do with the logical exclusion of the terms *man* and *brute*? It only means that we have blundered in regard to our subject, but not in regard to the exclusion. If X is possibly, to begin with, not an animal at all, it was folly to include him in either of two classes, *man* or *brute*, each of which implies *animal*. The fault here is a material or extra-logical one. But once X is included, or better thought as included,—for there lies the confusion of Mill and others,—in either the one or the other, the

term must be dealt with as belonging either to the one or the other, and this is all that logical law professes to do.

Again, Mill gives us the following :—

Every son of A is either B or C or D ;

But a son of A is dead ;

Therefore either B or C or D is dead.

The major proposition here, we are told, does not rest on the law of Excluded Middle, or on any necessity of thought, but on my knowledge of the fact. Did Mill really for a moment suppose that any one with common intelligence of the sphere of the Law of Excluded Middle ever imagined that the law informed him of this fact or any fact? At the same time, Once the logician is furnished with this major,—that every son of A is either B or C or D,—the law of Identity will tell him, that *every* absolutely precludes *more* sons than those specified,—that every cannot be interchanged with more than those specified. And on the strength of this Law and that of Excluded Middle, I am able to conclude that the dead son must be either B, C, or D,—for if these were not thought as exhaustive, and as thus limiting the inference within them,—if there might be more,—the dead son need not be either B, C, or D, but possibly E.

But we are immediately told by Mill that the judgment, *every animal is either a man or a brute*, is founded on the Law of Excluded Middle. Such a judgment is not in any proper sense “founded” on this law ; the law simply regulates the mutual exclusion of the terms. The true form of this judgment is,—*every animal is either a man or not a man*. That is all that the law says or can say. It does not enable us to identify *not-man* and *brute*. We must have the further knowledge, through comparison of the features of *man* and *brute*, that *brute* can be identified with what is *not-man*. The principle of Excluded Middle is here simply the scheme or form under which the otherwise known opposition of *man* and *brute* becomes logically available. Having found these, or having been given them, as opposed, we state the opposition in virtue of, or as a case of, the law of Exclusion between opposites.

§ 659. There is still a third form of Syllogism, which results from a major proposition which is at once hypothetical and disjunctive. Thus :—*If A is, then either B or C is*. Here the relation of the antecedent to the consequent is not affirmed directly, but only through mutually exclusive predicates. The reasoning then proceeds to sublate or remove the entire consequent :—

If A is, then either B or C is ;

But neither B nor C is ;

Therefore A is not.

We have now what is known as the Hypothetico-Disjunc-

tive Syllogism, or the Dilemma, called also *Cornutus* or Horned Syllogism.¹ It is called *horned*, because in the summption the disjunctive members of the consequent are opposed like horns to the assertion of the adversary. With these we throw it from one side to the other in the subsumption, in order to toss it altogether away in the conclusion.²

§ 660. Krug gives the following cautions regarding the legitimacy of the Dilemma, and they are well deserving of consideration. In sifting a dilemma, we ought to ask—

(1.) Whether a veritable consequence subsists between the antecedent and consequent of the summption?

(2.) Whether the opposition in the consequent is thoroughgoing and valid?

(3.) Whether in the subsumption the disjunctive members are legitimately sublated?³

Krug gives the following example which violates those conditions:—

If virtue were a habit worth acquiring, it must ensure either power, or wealth, or honour, or pleasure;

But virtue ensures none of these;

*Therefore virtue is not a habit worth acquiring.*⁴

Ueberweg borrows from Krug the following, which he characterises as “a scientifically justifiable trilemma”:—

*If the actually existing world were not the best of all possible worlds, then God did not either know the best, or could not create and preserve it, or did not wish to create or preserve it. But (because of the divine wisdom, omnipotence, and goodness) neither the first, second, nor third is true. Hence the actual world is the best of all possible worlds.*⁵

§ 661. The older view of logicians regarding the Dilemma takes in more than this form. It was recognised by Hamilton as a reasoning having a conditional major premiss with several antecedents, and a disjunctive minor. This is the view, among others, of Whately and Mansel. Dilemma would properly indicate two antecedents, but it is used to include

¹ Cf. Hamilton, *Logic*, iii. p. 350.

² Krug, *Logik*, § 85; Hamilton, *Logic*, iii. p. 352.

³ *Logik*, § 87.

⁴ Cf. Hamilton, *Logic*, iii. pp. 352, 353.

⁵ See Krug, *Logik*, § 87; Ueberweg, *Logic*, p. 459.

more than two—and in this case may properly be Trilemma, Tetralemma, Polylemma.

§ 662. Its forms are as follow, and they are regulated by the combined laws of Hypothetical and Disjunctive Reasoning :—

I. SIMPLE CONSTRUCTIVE.

*If A is B, C is D, and if X is Y, C is D ;
But either A is B, or X is Y ;
Therefore C is D.*

Here the common consequent is inferred.

II. COMPLEX CONSTRUCTIVE.

*If A is B, C is D, and if X is Y, E is F ;
But either A is B, or X is Y ;
Therefore either C is D, or E is F.*

The point of these two forms is, that whatever alternative be chosen, the same conclusion is inevitable.

III. DESTRUCTIVE.

*If A is B, C is D, and if X is Y, E is F ;
But either C is not D, or E is not F ;
Therefore either A is not B, or X is not Y.*

CHAPTER XXXVIII.

FALLACIES—FORMAL AND MATERIAL. (1.) FORMAL FALLACIES.

§ 663. Fallacy, in the widest sense of the term, includes every form of reasoning, or apparent reasoning, which leads to a conclusion either invalid, or such as ought not to be accepted, because of a fault in one or both of the premisses. A reasoning may be bad (1.) because the conclusion does not follow from the premisses; (2.) because the premiss or premisses are false in point of fact, or unduly assumed; (3.) because the conclusion is not the proof of the point which it is adduced to prove, or which the reasoner professes to prove.

§ 664. A fallacy is regarded either as a Paralogism or a Sophism,—the former when the person reasoning is in error, either as to premiss or conclusion, and is at the same time unaware of it; the latter, when a reasoning, bad either in matter or form, or in both, is employed with a full consciousness of it on the part of the writer or speaker, and thus with the purpose of deceiving. This, of course, is of no logical importance. What the science of Logic professes to do is to deal with the essential character of the reasoning itself,—so far as its rules can reach it.

§ 665. Aristotle divides fallacies into two classes—viz., those *παρὰ τὴν λέξιν* and *ἐξω τῆς λέξεως*, or, as it was afterwards put, *in dictione et extra dictionem*—in the expression and beyond it. Under the first head—in *Dictione*—he classes six fallacies—viz. (1.) *ὁμωνυμία* (*equivocation*); (2.) *ἀμφιβολία* (*ambiguity*); (3.) *σύνθεσις* (*fallacia a sensu diviso ad sensum com-*

positum); (4.) διαίρεσις (*fallacia a sensu composito ad sensum divisum*); (5.) προσφθία (*accent*); (6.) σχῆμα τῆς λέξεως (*figura dictionis*).

§ 666. Under the second head—*extra Dictionem*—he has seven classes: (1.) παρὰ τὸ συμβεβηκός (*fallacia ratiocinationis ex accidente*); (2.) τὸ ἀπλῶς ἢ μὴ ἀπλῶς (*a dicto simpliciter ad dictum secundum quid*); (3.) ἡ τοῦ ἐλέγχου ἄγνοια (*ignoratio elenchi*); (4.) παρὰ τὸ ἐπόμενον (*fallacia ratiocinationis ex consequente ad antecedens*); (5.) τὸ ἐν ἀρχῇ λαμβάνειν αἰτεῖσθαι (*petitio principii*); (6.) τὸ μὴ αἷτιον ὡς αἷτιον τιθέναι (*fallacia de non causa ut causa*); (7.) τὸ τὰ πλείω ἐρωτήματα ἐν ποιεῖν (*fallacia plurimum interrogationum*).¹

§ 667. Aristotle has thus really anticipated all the forms of fallacy which have been dealt with by subsequent logicians. But the division into *in Dictione* et *extra Dictionem* is not satisfactory or well founded. The class, *in Dictione*, may properly be referred to fallacies in the inference,—to cases, in fact, in which the conclusion does not follow from the premisses,—that is, Formal Fallacies.

§ 668. Those under the second head, *extra Dictionem*, may as a rule be referred either to the class of formal fallacies, or to that of Material Fallacies, in which the conclusion, while following from the premisses, is based on false or irrelevant premisses. This will appear as we proceed.

§ 669. There is, properly speaking, no specific class of the fallacies of language (*in Dictione*). Language may doubtless give rise to incorrect or invalid inference, but it does so because it leads to a violation of formal or logical law,—chiefly, in fact, to the making use of four instead of three terms in a reasoning. This is known as *quaternio terminorum*, or the *logical quadrupel*. This is most commonly manifested in what is known as *Ambiguous Middle*; in other words, in the use of a term which indicates more than one notion, and which is taken in a double sense in the reasoning. For the ambiguity of a word does not necessarily lead to invalidity of inference, unless in so far as the ambiguity is made use of in the reasoning process.

§ 670. The only sound division of Fallacies accordingly is into—(1.) those in which the fault is in the reasoning process itself,—in other words, those in which the conclusion

¹ *Top.* viii. 11; *De Soph. Elench.*, § i., c. iv. v.

does not follow from the premisses; and (2.) those in which, while the conclusion is justly drawn, one or more of the premisses is incorrect, in point of fact, unduly assumed, or such as, while professedly meeting the point at issue, really do not, and only yield a conclusion irrelevant to the question proposed. Thus there emerge only two grand kinds of Fallacies—those in the Form and those in the Matter of the reasoning.

§ 671. It should be noted generally regarding fallacies, that several of them have a tendency to run into each other, and that a so-called reasoning may be fallacious in more than one way. It is enough, however, if a bad reasoning can be fairly referred to one class or species of fallacy. All that can be aimed at in the classification of fallacies is to make the classes as exact as possible,—to specify their discriminating feature, and to show generally how the particular fallacy is to be avoided. And this classification at present must be based on the logical point of view. The sources of fallacy and of sophism, lying in natural tendencies and in surrounding circumstances—in the intelligence, and in the moral and imaginative nature of man, in impulses and preconceptions—form quite an independent sphere of inquiry. This was sketched in general, and, at the same time, grand outline by Bacon in his well-known *Idola*:¹ “A complete history of sophism,” says a French writer, “would be the political history of mankind.”

§ 672. Under the first head—the class of Formal Fallacy—we have the following:—

(1.) Those which violate the essential principle of the constitution of syllogism, as involving more than three terms.

(2.) Those which proceed on the non-distribution of the middle term—that is, on its particular distribution in each premiss.

(3.) Those that proceed on the universal distribution or quantification of major or minor term in the conclusion, while it was not taken universally in the premisses.

(4.) Those which proceed to an affirmative conclusion, while one premiss is negative.

(5.) Those which proceed on a so-called reasoning, in which neither premiss is affirmative.

(6.) (In Hypothetical Reasonings.) Those which proceed

¹ See *Novum Organum*, Book I. aph. xxxviii. *et seq.*

from the denial of the antecedent to the denial of the consequent.

(7.) Those which proceed from the affirmation of the consequent to the affirmation of the antecedent.

These exhaust the possibilities of formal error in Mediate Inference. There are other possibilities of error in Immediate Inference, as in Conversion, Opposition, Integration, Restriction; but these have already been provided for in the rules laid down regarding them.¹

§ 673. (1.) To the first of those heads—the *quaternio terminorum*—may be referred all the cases of what is known as *Ambiguous Middle*. Here we have really two middle terms whose difference is cloaked under some accident of expression; and thus, as we have a different concept in each of the premisses, the extremes of the conclusion have not been compared with the same third. Whately regards *Ambiguous Middle* as a semilogical fallacy—that is, partly in the matter (or expression), and partly in the form. It is essentially the latter—a formal fallacy, for it misleads only through its informality.

§ 674. Fallacies whose invalidity arises from ambiguity in terms, and the formal vice of which is a *quaternio terminorum*, may be classed as follows:—

- (1.) *Homonymia, or Equivocation.*
- (2.) *Prosodia, or Accent.*
- (3.) *Amphiboly.*
- (4.) *Figura Dictionis*, including *Paronymous Words, Etymology, Figurative and Direct Sense.*
- (5) *Composition and Division*, including the fallacy of *Interrogation.*

(6.) *Fallacia a dicto secundum quid ad dictum simpliciter*; and the converse, *A dicto simpliciter ad dictum secundum quid.*

§ 675. Those kinds of fallacies may be found in any term of a reasoning; but as a rule they are cases of what is known as *Ambiguous Middle*,—the middle term being that upon which the conclusion essentially depends. In the case where a premiss is not false, or unduly assumed, and where the conclusion is not invalidly drawn from the premisses, the fault will usually be found in the double sense of the Middle Term. There we ought to look for it.

¹ See above, chapters xxvii. and xxviii.

§ 676. It is obvious that if the middle term in a reasoning be ambiguous, or equivocal—*i.e.*, capable of being taken in either of two senses—our reasoning is likely to be utterly futile. And no form of fallacy is more common and more difficult to detect than this, especially when the two premisses containing the middle term stand far apart from each other.

Thus, for example, the word *expedient* may be used as meaning *conducive to the greatest good*, or *conducive to temporary prosperity*. I may argue that a particular course of conduct is expedient, by showing simply that I should by it secure a temporary object which I have in view. There would be no harm in my thus arguing, and thus acting even. But if I attempted further to vindicate my conduct by saying that it was *expedient* in the other or higher sense of being conducive to the greatest good—in fact, being absolutely useful and right—I should be guilty of identifying the two senses of the word, and substituting for the lower sense of the term the higher one, which I had not vindicated, or shown to be the sense in which my action was originally understood. This would be a case of Ambiguous Middle, in which I took a term in one sense in the one premiss, and in a different, even it might be conflicting, sense in the other.

As a simple instance of Ambiguous Middle, take the following:—

*Cicero's style entitled him to rank in the highest class ;
So did the style of Beau Brummell ;
Therefore Cicero and Beau Brummell both rank in the highest class.*

The Middle Term here is, of course, *style* ; but the style of the one referred to the turn of his sentences, that of the other to the fashion of his garments.

On a par with this is such a so-called reasoning as the following:—

*This side of the river is different from the other side ;
But the other side is a this side as well (say to the man opposite to me) ;
Therefore this side and the other side (that is, the different sides) are the same.*

§ 677. The most common type of ambiguity in the Middle

Term is when it appears to be one, but in point of fact is not. In the major premiss, it may be coupled with a condition ; in the minor, it may be taken singly. Of this sort is the old fallacy called the Horned (*Cornutus*, *Κερατίνη*). As—

*He who has not lost a thing, has it ;
You have not lost horns ;
Therefore you have them.*

Here the major refers only to what was actually in possession.

This is the key to the solution of many sophisms, as Aristotle shows in the *De Sophisticis Elenchis*.¹

§ 678. The first form of ambiguity in terms is known as *Homonymia* (*ὁμωνυμία*), or *Equivocation*. This arises when a term, taken by itself, has more than one signification,—that is, denotes more than one concept, and is thus capable of being taken in two different senses in the reasoning. Common examples are *light*, meaning *not heavy*, and *not dark* ; and *box*, meaning *a tree*, *a chest*, *a blow*.

As an example of fallacy arising from this source, we may take this :—

*The end of a thing is its perfection ;
Death is not the perfection of life ;
Therefore death is not the end of life.*

End is here ambiguous ; it means *final cause*, or *that for the sake of which a thing is* ; and it means *termination*. Hence the seeming paradox in the conclusion.

Again, the various meanings of the term *substance* give rise to fallacies of the same sort. Thus :—

*Substance is not quantity ;
Body is substance ;
Therefore body is not quantity.*

Some of the examples given by the older logicians are simply a play on words, or species of verbal pleasantry. Thus :—

*Every dog can bark ;
Some star is a dog ;
Therefore some star can bark.*

¹ Cf. Trendelenburg, *Et. Log.*, § 27.

§ 679. The term *truth*, from its various applications or denotations, lends itself readily to the fallacy of Ambiguous Middle. It may mean truth of fact, truth of consistency, truth of possibility, as opposed to actuality, &c. Some demonstrative systems of philosophy confuse the two first mentioned meanings, and thus make consistency in thinking equivalent to harmony of thinking with experience. Descartes, apparently, in his Criterion of Truth,—clearness and distinction,—confounds the conditions of possible thinking with the conditions of thinking a thing as it really is.

§ 680. *Sensation, Impression, Reason, Idea, Individual, and Individualistic, Subjective, Objective*, and many of the terms in Psychology, are peculiarly liable to ambiguous meaning and application.

Sensation is constantly confounded with Perception, without remark or explanation on the part of those using it. And thus the whole controversy between Realism and Idealism in Perception is obscured, and the point in many cases begged from the beginning.

§ 681. Hume's use of the term *impression* is of the most varied and misleading sort. It starts with an unproved assumption, and it ends in confounding together mere *sensation, apprehension, emotion, desire, and volition*. Impression, as he employs it, is of no valid use whatever as a middle term in a reasoning.

§ 682. *Reason* is nearly equally misleading. It is used for *Understanding, Reasoning, Reason* as source of principles, what is called *Pure Reason*, and in a host of other ways.

Idea means almost anything, and therefore practically nothing, in connection with knowledge. And *the Idea, the Universal, &c.*, as used for the bare form of knowledge, has the worst possible suggestion of the separability of matter and form, and the hypostatizing of the latter as, first, a distinct entity, and then as all in all in the end.

Individualistic, as applied in these days to systems of philosophy of the most opposite sort, has the vaguest and most shifting of meanings.

Individual, individualism, or individualistic, may be employed in at least the following applications, which are varied, and some of which are conflicting.

(1.) *Individual* may be used for *singular and particular*.

In the former case, it means *this, that, one*; in the latter case, it means *some (at least)*. In the first meaning it is opposed to the plurality of units in time; in the second, to the universality of the concept. It is *one of many*, and *some of all*. This is the logical ambiguity of the term.

(2.) *Individualism* in philosophy may mean that knowledge is the impression or state of the consciousness of each individual in the world; that, however different, these impressions are equally true or the truth, simply because they are the impressions of the individual. The truth, thus, for the individual in his youth may be wholly different from the truth for the same individual in his prime; and what is true for one, may be false for another. This is in substance the Protagorean *Homo mensura*.

(3.) *Individualism* may mean a series of sense impressions, regarded simply as conscious states, and as forming the sense experience of each individual, and even being all that is of world reality.

(4.) *Individualism* may mean that, in the last resort in human thinking, the test of a principle or universal condition of knowledge is the self-evidence and necessity which constrain each individual to accept it as a principle or condition of our knowledge. This constraint, as not peculiar to one individual more than to another, would be a common or universal property of all human thinkers; such a theory would be quite opposed to the Protagorean *Homo mensura*.

(5.) Again, it may be held that as man thinks only as sharing or being a part of the consciousness of God, a philosophy which repels this view is individualistic. A classification of philosophies under this negative head would lead to the most indiscriminate grouping which it is possible to conceive. •

(6.) *Individualism* may further mean the negation of Pantheism, or the assertion of finite reality in a sense which is incompatible with Pantheism, understood as the doctrine of a single consciousness pervading the world.

§ 683. *Subjective* and *Objective* admit of various meanings. In contrast, the one marks the knower, the other the known. The known may be regarded as (1.) that which is in relation to the knower; (2.) that which is independent, and subsists *per se*; (3.) that which transcends the known and definitely

knowable. *Objective* is, however, sometimes used for that which is necessarily or universally connected in knowledge. This may, after all, be but a series of sensations, and therefore wholly subjective as to matter, and even form.

To these may be added such phrases as *the government, the church, experience, wealth, &c.* Definition, consistently held by, is the only remedy for ambiguous terms.

§ 684. The second form is *Fallacy of Prosody, or Accent* (προσῳδία).

This arises when the same word, having different significations, receives its meaning from the mode of pronunciation. Words vary in meaning according to accent proper, quantity of syllable, spiritus lenis et asper, &c. Accentuation may either remove or cause ambiguity.

The same word or phrase may be so pronounced, accented, or emphasised as to convey one of two wholly distinct meanings. And if the term or phrase be a quotation, it may, by the accent or mode of pronunciation which accompanies it, be made to convey a meaning wholly different from that originally intended. What was ironically said, or said in joke, may thus be made to appear as if it were seriously spoken, and conversely. In quotation, by the introduction of italics, as has been remarked, we may wholly change the scope of a statement.

§ 685. The third form of ambiguity is *Amphiboly*. This is a double meaning in or through the structure of the sentence, or somehow from the context, while the words themselves may have but one definite signification. It depends, in fact, frequently, on that fault in syntactical construction through which a word or expression may be connected either with what goes before or with what follows it. Thus:—*Qui scit literas hodie didicit.* This may mean either *qui scit literas hodie, didicit*, or *qui scit literas, hodie eas didicit*.¹

I have made thee free a slave.

Then there is the well-known line, which has come down in nearly all logical compends:—

Aio te, Æacida, Romanos rincere posse.
(*Pyrrhus the Romans shall I say subdue.*)

¹ Given by Duncan as an example of the Fallacy of Division, but better as Amphiboly.

And we may add :—

πεντήκοντ' ἀνδρῶν ἑκατὸν λίπε δῖος Ἀχιλλεύς.

But as Achilles could not out of fifty men leave a hundred, we must suppose that out of a hundred he left fifty.

§ 686. The fourth form is *Figura Dictionis* (σχῆμα τῆς λέξεως). Aristotle describes this as taking place when that which is not the same thing is expressed in the same way, as masculine taken for feminine, or feminine for masculine, or neuter for either, or action for suffering. Thus, because *to burn* and *to cut* are actions, we may suppose that *to rest*, *to be well*, &c., are also actions.

More important forms of this fallacy arise when, under the same word, different categories, or kinds of categories, are confounded. Thus :—

*What is snow, that is not milk ;
But snow is white ;
Therefore milk is not white.*

Here the reference in the *what* (*quod*) is to snow as a substance or distinct object, while the conclusion refers to quality. So :—

*Qui heri eras idem hodie es ;
At qui heri eras sanus ;
Ergo hodie sanus es.¹*

§ 687. To this may fairly be referred the commonplace fallacy usually classed under the head of *Fullacia ex Accidente* :—

*What is bought in the market is eaten ;
Raw meat is bought in the market ;
Therefore raw meat is eaten.*

Raw meat is not properly an answer to *what*, but to *what sort of meat*.

§ 688. Under this head may, also, be included the fallacy known as that of *Paronymous or Conjugate Terms*.

Paronymous terms are terms derived from the same root. They may be substantive, adjective, or verb. Thus we have *presume* and *presumption*, *project* and *projector*, *assume* and *assumption*, *expedient* (noun), *expedient* (adjective), *expediency*

¹ *Top.*, i. iv. ; *Duncan, Inst. Log.*, L. v. c. vii.

(noun). Each of these sets of words is from the same root. But they have not necessarily the same or a synonymous meaning. If we employ them in a reasoning as if they had, we shall probably draw a false conclusion. To take a common example:—

Projectors are not to be trusted ;

This man has formed a project ;

∴ He is not to be trusted.

In this case the ambiguity lies in the middle term, and it leads us wholly wrong. So with *assume*, *assumption*, and *assumptive*. We may innocently *assume* a thing to be true ; we may be guilty of *assumption* in our conduct. These are paronymous terms, but they are not synonymous.

§ 689. To the *Figura Dictionis* may be referred the *Fallacy of Etymology*. This arises when it is supposed that, because of the original meaning of a word being such an one, it must necessarily retain that meaning through all subsequent usage, or that this meaning is to override or supersede an acquired, and, it may be, extended or purified signification. Most of the words in the science of mind had originally a material reference. And in this instance the fallacy would consist in assuming or maintaining that such words have thus necessarily no wider or higher reference.

We have illustrations of the fallacy of Etymology in such cases as *right*, *truth*, &c. As *right* is from *rectus*, and this from *rego to rule*, it has been inferred that all right is a creation of the law. There is here as gross a *hiatus* in the proof as can well be conceived. So with *truth*. As this comes from *trōw, to believe*, it has been inferred that truth can only mean what each believes, or individual opinion,—the Protagorean *Homo Mensura*. *Spiritus*, *animus*, *anima*, *ἄνεμος*, signifying originally *breath* and *air*, are not to be held as only signifying these. *Comprehension*, *Conception*, meaning originally a grasping or holding several sensible things, as one or in one, are not on that account to be limited merely to sensible objects or singulars. In all these cases there is a *hiatus* which virtually begs the question regarding the present meaning of the word.

§ 690. To the *Figura Dictionis* may be referred the fallacy arising from a change of the *Figurative* to the *Direct Sense*—thus:—

*The mind sees ;
 Seeing is an organic act ;
 Therefore the mind in seeing puts forth an organic act.*¹

§ 691. The fifth form includes the fallacies from *Composition and Division*. *Fallacia a sensu diviso ad sensum compositum*, and *A sensu composito ad sensum divisum*.

(1.) The fallacy of Composition (σύνθεσις) arises from the conjunction of the separate. Here the composite meaning is false, while the divided is true.

(2.) The fallacy of Division (διαίρεσις) arises from the separation of the conjoint. Here the composite meaning is true, and the divided false.

In other words, the fallacy of *Composition* arises when we first of all take a term distributively, and then argue from it as if it had been taken collectively. Thus, in numbers, we may say *6 and 5 are even and odd* (taken distributively); *11 is 6 and 5, therefore 11 is even and odd*. The fallacy lies in the *Composition*.

Again, if we take a term collectively, and argue as if it had been taken distributively, we have the fallacy of *Division*.

By distributively, we mean *each* of several things, and in speaking of them we predicate of each. By collectively, we mean *the whole* of several things, and in speaking of them we predicate of the *whole*. This ambiguity comes out in the word *all*. *All* may mean *every one*, or it may mean *the whole*; and these are two very different things indeed. We may say, *all prudent men are thoughtful*. Here we mean to predicate *thoughtfulness* of *every one* of them taken singly. When we say *all these fish weigh 100 pounds*, we do not express ourselves unambiguously, but we would naturally be taken to mean not *every* one, but *the whole* taken together. If we argue from *all* meaning *every one*, as if it meant *the whole*, we should have the fallacy of *Composition*; if from *all* meaning the whole, to all meaning *every one*, we should have the fallacy of *Division*.

Examples : Fallacy of Composition. Thus we may say :—

*This man is good, and a workman ;
 Therefore he is a good workman.*

¹ Cf. Reiffenberg, *Logique*, p. 69.

One of the learned men at the table of the Emperor Conrad III. asked him one day—"Have you an eye?" "Yes, certainly," said the Emperor. "Have you two?" "Assuredly," was the reply. "But one and two make three; you have, therefore, three eyes." The Emperor was puzzled, but did not believe the Scholastic.

Examples: Fallacy of Division:—

*This man is a good workman;
Therefore he is good, or a good man.*

Or—

*The planets are eight;
But the Earth and Mars are planets;
Therefore the Earth and Mars are eight.*

§ 692. The Fallacy of Interrogation, *Fallacia plurium Interrogationum*, may be fairly referred to the head of *Fallacy from Division*. Here we ask several questions in a way which makes them appear to be but one. In giving our assent to the question, we probably mean to assent but to one of the questions really involved, but it may be taken as an assent to another of the concealed questions, to which we should probably demur. Our assent to the one may, then, be taken as an assent to another wholly different, or to each involved; and on this assumption a reasoning is founded.

Perhaps the commonest form of the fallacy is that kind of question which assumes or implies a thing to be true by asking about the time or manner of it. *How long is it since you ceased to be temperate? When did you leave off stealing? How did you contrive to effect your escape? Who is the man on the wall?*

Another form is that of asking the cause of a fact, before the fact itself is ascertained to be real.

Commonly, several different qualities are grouped in the interrogation. *Was not Cicero an excellent citizen, orator, poet, and soldier?* If the answer be in the affirmative, the quality which he did not possess might be seized upon as that which was admitted. The obvious solution is an analysis of the composite question into its parts, and separate reply to each.

§ 693. *Fallacia a dicto secundum quid ad dictum simpliciter*; and the converse—*A dicto simpliciter ad dictum secundum quid*.

(1.) The first form arises when we take what is predicated with restriction as true absolutely, or make what is said only generally to be true universally. A statement is true in some respects, with certain qualification; it is taken as true absolutely. Thus it may be true that, in the case of sleeplessness, to take an opiate is desirable; but it does not follow that taking an opiate, as a general rule, or even in all cases of sleeplessness, is a good thing. So a war in self-defence, or to protect the oppressed, may be proper; but war itself, or as a general condition, is not therefore desirable or proper. The fallacy is prompted by the common tendency to hasty generalisation.

If the principle of this fallacy were admitted, we might argue that because the negro has white teeth, he is white; or that bullion ought to be thrown into the sea, because it ought to be thrown into the sea to avoid shipwreck.

We should be guilty of this fallacy if we passed from the proposition that *non-being is conceivable*, to this, *that non-being is*. Or if we said, *being is not really, because it is not one of the things which are*, for example, *not man*; for not to be this or that thing, and not to be absolutely, are by no means identical.¹

To this may be referred the old fallacy, or joke, known as *the masqued* (ἐγκεκαλυμμένος) attributed to Diodorus (Cronos), of the School of Megara. A man in a mask is introduced. It is asked, *Do you know him?* *No. This man is your father; therefore, you don't know your father.*

∴ § 694. To this head may be fairly enough referred the *Fallacia ex Accidente*.

This arises when it is supposed that, because there may be various accidents in a subject, all these accidents are in the attributes of the subject, or in the subject itself. Thus, taking Aristotle's negative illustration:—

Coriscus is other than Socrates;
Socrates is a man;
Therefore Coriscus is not a man.

Here we are speaking of the individual Socrates, or of Socrates in what distinguishes him from other men, and, therefore, *man* as not distinctive is not an essential, but, so to

¹ *Top.*, i. v.

speak, in this reference, an accidental mark of the individual. We here affirm of the accident what is true only of the subject.¹ • This fallacy is properly a reasoning from the unessential to the essential. It consists in attributing to a thing as constitutive and constant, that which belongs to it only accidentally or temporarily, yet does not follow from its nature. "An isolated fact," says Marmontel, "rare and without consequence, given as constant; a passing or special abuse taken for the state of things habitual and general,—there is the means of revolutions."

§ 695. The converse—*A dicto simpliciter ad dictum secundum quid*—arises when we take what is said or admitted generally, or of the nature of the thing, as true or admitted with unrestricted universality. Thus we may admit that mountain-climbing is a pleasant and exhilarating exercise, but it would be going beyond what we meant if we extended the statement to all circumstances whatever, even in mist or a snow-storm. A soft voice is no doubt agreeable, but not necessarily at all times. We may sometimes even prefer the silence that is said to be golden.

It may be a sound principle, that what has been intrusted to you to keep should be returned to its owner on demand; but not a sword or a rifle, if the owner asks it in a state of drunkenness, fury, or madness.

§ 696. All the fallacies now mentioned are to be solved by distinguishing the double meaning of the ambiguous term. This may be either major or minor; usually it is the middle term. When the distinction is made, the so-called reasoning appears with four terms, and is thus invalid in its very constitution.

§ 697. (2.) The second of the formal fallacies to be considered is that of *Undistributed Middle*. This is a violation of the rule which prescribes that the middle term in a reasoning must be taken in its full extent (or distribution), once at least in the premisses. This law holds on every theory of reasoning,—whether Aristotelic or other. There must always be a common third, and the community is only secured through distribution of the middle term. The apparent exception in the case of Ultra-total Distribution has already been dealt with, and its value estimated.²

¹ *De Soph. Elench.*, i. v.

² See above, p. 423 *et seq.*

§ 698. A person may argue, or rather seem to argue, in this way :—

Food is necessary to life ;

Mutton is food ;

Therefore, mutton is necessary to life.

We know instinctively that there is something wrong in this reasoning. But can we lay our finger on the fallacy, and expose it on intelligible and assured grounds? Not unless we apply logical rule. Let us look at the propositions. We say *food is necessary to life*. We mean by this, of course, *food in some form—some kind of food*. Then we say—*Mutton is food*—i.e., *a kind of food, or a part of food*. Now these two statements do not warrant our conclusion that *mutton is necessary to life* ; for this would be to imply that *mutton only is food, or is all food*, whereas we have not said any such thing. The middle term of the reasoning here is *(some) food* ; it is taken in one part of its application in the major proposition ; in another part, not necessarily the same part, in the other proposition. We have not, therefore, the same term with which to compare the other two terms of the conclusion ; and thus we cannot draw or prove our conclusion. This is what is called the fallacy of Undistributed Middle. The middle term is not taken in its full extent or application in any one of the premisses, and, therefore, the major and minor terms have not been compared with the same or a common term. We have illustrations of the same fallacy in such an apparent reasoning as this :—

Blue is a colour ;

Red is a colour ;

Therefore blue is red.

Here we speak in each proposition only of *some portion* of the class *colour* ; but it does not follow that this is the same portion in both cases ; therefore we cannot have a conclusion at all. We might as well argue that because *men* and *whales* are *animals*, *all men are whales*. They are both animals, no doubt, but they belong to wholly different portions of the class *animal*—i.e., the term with which they are compared is not distributed ; they are not, therefore, compared with the same thing, only with different portions of the same thing, and there is, therefore, no inference.

§ 699. Cases of Undistributed Middle occur only in the quantity of Extension.

Obviously a term distributed in a reasoning must remain the same, as predicate or as subject of predication through the reasoning. When I say—

All the stars have a movement;

All the stars are subject to the law of gravity;

I speak of the same subject, and on these premisses I can found an inference. When I say—

Some stars are luminous;

Some stars are subject to eclipse;

I do not know whether they are the same stars or not, and therefore cannot found an inference.

This, then, refers to a term taken in Extension. A singular term, or a term taken in Comprehension, is to be regarded as distributed, or rather taken as an indivisible totality. In *Plato was pupil of Socrates*, and *Plato wrote the Republic*, there is reference to the same subject. So in the case of abstract terms—that is, really terms taken in comprehension—as *justice*, *virtue*, *courage*, &c. Here, we necessarily speak of the whole, and therefore of the same.¹

§ 700. (3.) The third case is that of fallacies which arise from a violation of the rule that no term shall be taken in the conclusion at a greater quantity or distribution than that which was given to it in the premisses. Of this fallacy we have two forms—(1.) If the predicate of the conclusion be taken at more than its right, we have illicit process of the Major Term. (2.) If the subject of the conclusion be so taken, we have illicit process of the Minor Term.

§ 701. To take an example :—

Whoever is capable of deliberate crime is responsible;

A lunatic is not capable of deliberate crime;

Therefore a lunatic is not responsible.

Now you will perhaps not dispute the conclusion here that *a lunatic is not responsible*. But the question is, does this conclusion follow from the premisses which you have laid down? In other words, have you proved it? You have not in this case. This is about as bad a specimen of reasoning as

¹ Cf. Delarivière, *Nouv. Log., Classique*, L. II., § ii. c. iii.

could well be given. Yet it looks plausible enough. But analyse it; apply to it the rule of reasoning which has been stated. *Whatever is predicated, affirmatively or negatively, of a term distributed, may be predicated in like manner of everything contained under it.* We predicate, then, in our apparent reasoning, *responsible of every one capable of deliberate crime.* So far good. But then we merely say that a lunatic does not belong to the class that is *capable of deliberate crime.* We have no right, therefore, to infer from this that a lunatic is not responsible; for, for aught we have said, responsibility may be wider than those capable of deliberate crime. Having affirmed *responsibility* of a class of people, we have no right, on that ground, to deny it of a person or persons who do not belong to that class. The fault here lies in taking one of the terms—viz., the major, *responsible*—in a particular or limited application only in the major premiss, while in the conclusion you take it universally or in the whole, of its application. This is called, technically, *illicit process of the major term.*

§ 702. Again:—

*Stories of massacre related of the Russians are shown to be false ;
Stories of massacre related of the Turks are shown to be false ;
Therefore all stories of massacre related of either are false.*

Now this conclusion says that *all* stories of massacre related either of Russians or Turks are false. But it is a bad conclusion; for in each of the premisses we have spoken only of *some* stories of massacre related of both, and we have no right, therefrom, to include that *all* the stories of massacre related of them are untrue. This is what is called illicit process of the Minor Term. We take the minor term particularly in the premisses—i.e., we take but a part of it—and in the conclusion we make an assertion regarding the whole of it.

§ 703. There is more chance of our falling into the mistake of Illicit Process of the Major than of the Minor Term. In ordinary reasoning, and in ordinary syllogistic form, we are not careful to express the precise quantity of the predicate, as usually particular in affirmative propositions. When we say—*All Y is X*, we usually mean *some X*, but we do not say so. It is enough if *Y* be *some X* for our affirmation. But in drawing our inference this point requires attention. We may

readily be led to suppose that we spoke of *all* the *X*'s as well as of *all* the *Y*'s. In this case we should go wrong. We may say :—

Every animal lives ;
A plant is not an animal ;
Therefore no plant lives.

In the major premiss we really mean to say that every *animal is some living thing*, but not being careful enough to express this, we find ourselves landed in the conclusion that *plant is not any living thing*. As to the subject we are usually on our guard, and we generally know whether we are speaking of *all* or *some* ; hence we do not so readily fall into the error of taking the subject of the conclusion at a greater quantity than that which we have assigned to it in the premisses.

§ 704. (4.) The fourth fallacy in form, is, when we proceed to an affirmative conclusion, while one premiss is negative. This arises from a violation of the fundamental law of syllogism, already explained.

§ 705. (5.) The fifth form of bad reasoning arises when we proceed to any conclusion whatever, while neither premiss is affirmative. This fallacy also arises from a violation of a fundamental law.¹

This form may be typified thus :—

A cat is not a biped ;
A dog is not a biped.

Therefore, you can say nothing either about dogs or cats. Cannot you say, in this case, that dogs and cats agree in not being biped ? Well, if you choose to think this worthy of the name of inference, you may. Can you say that bipeds are neither dogs nor cats ? No ; because you have not asserted that bipeds even exist. You have only said that the notion of a dog and the notion of a cat do not harmonise with the notion of a biped. But whether there are really cats or dogs you have not said, far less whether there are bipeds. From negative premisses you can infer nothing ; for the simple reason that you have not affirmed the agreement of any one of the supposed terms of the conclusion with a middle term.

¹ See above, pp. 388, 390.

And the conclusion is always the assertion—the necessary assertion of a relation between terms.

§ 706. (6.) In Hypothetical Reasonings, those which proceed on the denial of the antecedent to the denial of the consequent. The principle of this fallacy has been already explained. Thus :—

*If this thing be sentient, it is living ;
But it is not sentient ;
Therefore it is not living.*

This is equivalent to the fallacy in Categoricals, known as Illicit Process of the major term. Thus :—

*All sentient is (some) living ;
This thing is not sentient ;
Therefore it is not (any) living.*

But if we specify or quantify the terms, we may have an inference that is valid on this process. Thus :—

*All sentient is (some) living ;
This thing is not (any) sentient ;
Therefore this thing is not (some) living.*

So in the hypothetical. Thus :—

*If the penal laws against Papists were enforced, they would be aggrieved ;
But these laws are not enforced ;
Therefore Papists are not aggrieved.*

This conclusion is invalid, as it stands, since Papists may, as a matter of fact, have other sources of grievance than that here specified. But if we quantify the terms, we get a perfectly valid inference. Thus :—

If the penal laws against Papists were enforced, they would be (some) aggrieved ;

Or—*They would have a definite grievance ;*

But these laws are not enforced ;

Therefore Papists are not (some) aggrieved ;

Or—*They have not the definite grievance which follows from the enforcement of the penal laws.*

§ 707. (7.) Those which proceed on the affirmation of the consequent to the affirmation of the antecedent. Thus :—

*If this thing is sentient, it lives ;
But it lives ;
Therefore it is sentient.*

This, as it stands, is incorrect ; and the fallacy corresponds to that of the Undistributed Middle in Categoricals. Thus :—

*All sentient is (some) living ;
This thing is (some) living ;
Therefore it is sentient.*

This proceeds in Extension. If we take it in Comprehension, it will read thus :—

** If this thing has the mark sentiency, it will have the mark life ;
But it has the mark life ;
Therefore it has the mark sentiency.*

Here we have not said that *everything having the mark life has the mark sentiency*, only that *everything sentient has the mark life*. But on this assumption the conclusion turns, and it is thus invalid ; for the *living* or the *mark life* may be found, for aught we know, in other than the sentient. *If there be sentiency, there is at least life*, states the connection between two terms, but not their convertibility, or the singularity of the connection. The mistake lies, as Aristotle pointed out, in supposing the consecution to be reciprocal.¹ The following are Aristotle's examples :—

*If a thing has been created, it had a beginning ;
This thing had a beginning ;
Therefore it was created.*

*If this man has a fever, he is hot ;
But he is hot ;
Therefore he has a fever.²*

§ 708. Even in the denial of the consequent, we must be careful to observe that the denial is precise, otherwise we have no inference. Thus :—

*If this thing be sentient it is (some) living ;
But it is not (some) living ;
Therefore it is not sentient.*

¹ *Top.*, i. 5.

² *Ibid.*

This conclusion is only valid on the supposition that *the some living* spoken of in the sumption is identical with *the some living* spoken of in the subsumption. What we really mean to assert is, that it is not *this some living*, which is included in *sentient*, for if it were *some other living*, we have introduced a proposition which is not the denial of the consequent. In the ordinary form, the subsumption appears as a universal negative, and hence there is no difficulty: but if quantification be introduced, we may, without care, have an irrelevant subsumption.

CHAPTER XXXIX.

FALLACIES—(2.) MATERIAL FALLACIES.

§ 709. Before proceeding to consider the Material Fallacies, or those in which, while the conclusion actually follows from the premisses, it is yet incorrect in point of fact, or irrelevant to the point at issue, it is necessary to observe the relations of true and false premisses to the character of the conclusion, as itself true or false.

On this subject the following rules may be laid down:—

(1.) If both premisses be true, that is, correct representations of reality, and if the conclusion be validly drawn therefrom, we have the certainty of a true conclusion, or judgment in harmony with fact.

This is grounded, as Aristotle has pointed out, on the law of Non-contradiction. If *A* being, *B* necessarily is; and *B* not being, *A* necessarily is not; then if *A* is true, *B* is necessarily true: otherwise, the same thing (*A*) would at one and the same time be and not be.¹

(2.) If one premiss be true, and the other false, or even if both premisses be false, and the conclusion be correctly drawn from them, the conclusion may yet be true in point of fact. In this case we have not a sufficient reason for our belief in the truth of the conclusion, so far as this argument goes; but we may still correctly hold the conclusion as true in point of fact.

(a) One premiss false. Thus:—

No white is animate;
All snow is white;
Therefore no snow is animat

¹ *An. Pr.*, ii. 2.

Here the conclusion is true in point of fact, but not because of the reason given.

(b) Both premisses false. Thus:—

*No man is animate ;
Every stone is a man ;
Therefore no stone is animate.*

Here, also, the conclusion is true in point of fact, but not because of the reason given. In these cases the true emerges by chance, as Aristotle remarks—not from the necessity of things.

To suppose this rule otherwise would be to fall into one form of the hypothetical fallacy already noticed—viz., the antecedent is not, therefore the consequent is not:—

*If man is, animal is ;
But man is not ;
Therefore animal is not.*

This is really equivalent to the fallacy of supposing that because the reason is false, the conclusion alleged to be founded on it is false; or because a reason adduced has been disproved, the conclusion has necessarily and absolutely been disproved.

Suppose a person argues for the existence of Deity from the alleged fact of its being universally believed, or believed by all nationalities, an opponent might conceivably overthrow the proof by adducing an instance of a nation in which no such belief exists. In this case the proof would go for nothing; but it would be a fallacy to suppose that the conclusion was absolutely disproved.

§ 710 (3.) If the conclusion be false, and there be no flaw in the reasoning, one or other of the premisses must be false. If the conclusion be true, the truth of the premisses is not thereby guaranteed; but if the conclusion, formally valid, is false, the falsity of a premiss, one or both, is established.¹

This principle is of the utmost importance in examining a hypothesis. From a false hypothesis you may deduce a true proposition, as Ptolemy did, when, from an incorrect description of the celestial movements, he deduced the nature

¹ See *An. Pr.*, ii. 4.

and periods of the eclipse of the moon, and the duration of the month and year. In these cases, conclusions true in point of fact were drawn from erroneous premisses. It comes to this, that the antecedent may, and therefore commonly does, extend more widely than the antecedent as predicate to the subject; for what springs from this cause may also issue from another. For example, if you cut a right cone so by the plane, that the section is parallel to the base, there will be a circle; but if there be a circle, this is rarely the cause of it.¹

§ 711. Material Fallacies depend either (1.) on the falsity of the premiss or premisses, or (2.) on the undue assumption of a premiss, or (3.) on the irrelevancy of the conclusion in respect of the question proposed or point at issue.

§ 712. (1.) With regard to false premisses, the conclusion correctly drawn from them may be either true or false. But this of course is by accident; and there is no reason or necessity which, in the argument, can be held as guaranteeing it. This is known as the *fallacia falsi medii*, as it is on the connection of the middle term with the extremes, in this case unreal, that the conclusion is supposed to turn.

§ 713. The fallacy of *Imperfect Disjunction* may be taken as an instance of a false premiss. In Indirect Proof, which depends mainly on disjunction, and a disjunctive major premiss, fallacy frequently arises from an incompleteness in the disjunctive statement. The principle of disjunction is, as we have seen, the full statement or exhaustion of the possibilities of the case, and a consequent reasoning from affirmation to negation, or negation to affirmation. Clearly, then, if we omit a possible case to start with, our conclusion will be materially false.

§ 714. In Mathematics, complete disjunction is easily accomplished—as when we say, *rectilineal triangle is either rectangular, or obtuse angular, or acute angular*. If this figure is not the first, it is either the second or third. But in the Observational and Moral Sciences this is not so easily carried out. In Theology our disjunction is often purely nominal, as turning on a subject which is incapable, from its nature, as transcending experience, of strict definition and exhaustive possibilities.

¹ Cf. *An. Pr.*, ii. 4; and Trendelenburg *in loco*, *El. Log.*, § 32.

Thus, it has been argued that *we cannot live happily in this world, since in life we must either abandon ourselves to our passions, or combat them.*¹ If we do the former, we have no happiness, but a feeling of shame and dissatisfaction. If we do the latter, we live in a constant state of internal warfare, and, therefore, of pain. This disjunction is incomplete, inasmuch as we omit the alternative of reasonable control and temperance in life, which may lead to happiness, perhaps alone to what people call happiness.

We have an illustration of imperfect disjunction in the case of the reasoning of the Islanders of Otaheite, when Captain Cook arrived on their shores, bringing a sheep in his vessel. They were puzzled at first, not having seen quite such an animal before. How was it to be classed? All the creatures known to them were pigs, dogs, rats, and birds. The new object appeared to be neither a pig, nor a dog, nor a rat, therefore they concluded it was a bird of some new sort, for birds were to them of varied kinds.

§ 715. In a reasoning, whether simple or complex, there are two essential rules. (1.) "That no proposition [which is provable] be employed as a principle of probation, which stands itself in need of proof.

(2.) "That nothing else be proved than the proposition for whose proof the probation was instituted."² The first of these rules should be qualified by the terms in square brackets. There are propositions of immediate certainty, which may be employed legitimately in probation.

These two rules embrace the various forms of formal fallacy, known as (1.) *Petitio principii*, or *Fallacia quæsitæ mediæ*, τὸ ἐν ἀρχῇ αἰτεῖσθαι.

(2.) Ὑστέρων πρότερον.

(3.) *Circulus in demonstrando*,—*diallelus*,—ὁ δι' ἀλλήλων τῶπος.

(4.) *Saltus vel Hiatus in demonstrando*, *Leap in Probation*.

(5.) *Heterōzetesis*, *Ignoratio vel Mutatio Elenchi*, and *Transitus in aliud genus*, vel *a genere ad genus*,—μετάβασις εἰς ἄλλο γένος.

§ 716. *Petitio Principii*, taken first in its wider sense, de-

¹ Cf. Reichenberg, *Logique*, p. 101. For some excellent illustrations of incomplete disjunction in Apagogical Demonstration, see Ueberweg, *Logie*, p. 582.

² Hamilton, *Logic*, iv., L. xxvi. p. 52.

notes any reasoning in which a premiss is assumed, the certainty of which is not greater than that of the conclusion it is adduced to prove, and which may be doubted on the same grounds as the conclusion itself. This is the undue assumption of a premiss in the widest sense,—a premiss open to doubt, uncertain, not conceded by the opponent, or not properly to be conceded by him, unless it can be established on grounds similar to those which would establish the conclusion. By the older logicians this was expressed by the assumption, “*Id quod æque ignotum est ac ipsa quæstio.*”¹ Hamilton gives as an illustration of *Petitio Principii* in this its wider sense, Aristotle’s argument for slavery. The barbarians, as of inferior intellect, are the bondsmen of the Greeks, and the Greeks, as of superior intellect, are the born masters of the barbarians. Here, of course, the assumption in the premisses of relative inferiority would be questioned by an opponent as much as the conclusion itself.² An opponent of slave-holding might be met by the proposition or argument that slavery is to be upheld because it brings cheap labour, and this is an advantage to the general social wellbeing. The opponent might very fairly reply that this advantage—even if admitted—is not proved to counterbalance the disadvantages of slave-holding, in its bearings on the moral and social character of the people among whom it subsists. He might urge, besides, that the conclusion is irrelevant to the true and higher point at issue—as to whether slavery is permissible at all on moral grounds. This runs into a case of the fallacy to be noticed below—known as *Ignoratio Elenchi*.

§ 717. What is known as the *saltus* or leap in a probation may, as Hamilton points out, be reduced to the first form of the *Petitio Principii*. We may, for the sake of brevity, omit propositions in a proof; this is not the *saltus* proper. We do so in the *Sorites*, which is quite valid. But when, in a series of reasonings, we pass from one proposition to another, which is not logically connected with the former, except through another intermediate proposition, which we have not proved, then we commit a *saltus*. This, in fact, is simply an instance of an unduly assumed premiss,—generally, as if it did not need proof, while it does require it. Thus:—

¹ Cf. Duncan, *Inst. Log.*, v. p. 321.

² *Logic*, iv. L. xxvi.

A. B. committed the murder ; therefore, he was more or less insane.

Or, to take an example from Krug :—

Socrates was not a Christian ; therefore his good works were only sins.

This thing had a beginning ; therefore it was created.

This man stole the apples ; because he was in the garden an hour before it was discovered that they were stolen.

We commit a *saltus* every time we pass directly from fancy to reality, or from the possible to the actual. One practical form of the fallacy is the contention made by idealising yet indiscreet reformers, when they assume that because their scheme of government or social change is sound and good, it ought to be applied to a given state of society, without consideration of the actual conditions or circumstances which might actually frustrate its beneficial operation.

§ 718. The second form of *Petitio Principii*, known also as *ὑστερον πρότερον*—*hysteron proteron*—is that usually considered as a *petitio*, or *begging of the question at issue*. This arises when a proposition is employed as a ground of proof, the truth of which depends on the truth of the proposition—that is, conclusion—which it is adduced to prove.

One solution of the question at issue is assumed in the premiss, and this assumption involves the truth of the conclusion which it is set up to prove. This is strictly *begging the question*, borrowing, or snatching an answer. This is not properly reasoning, but re-assertion ; and it is usually cloaked by a change of terms, while the meaning or effect is the same. This was expressed by the older logicians as assuming “*pro medio id quod in quæstione est verbis aliquantum mutatis.*”¹

§ 719. Technically, the mistake here arises from our inferring, or supposing that we infer, a conclusion from itself. There is here no proper syllogism ; for our conclusion is not drawn from two different propositions taken together, but really from one proposition only. We repeat, in the so-called conclusion, one of the premisses, and there are thus not three distinct propositions in the syllogism. Thus, I may ask—*Is this decision of the Synod to be accepted as sound ?* And I may be told Yes, *because the deliverances of the Synod are right.*

¹ Duncan, *Ibid.*

noratio Elenchi in its general forms—irrelevant conclusion, proving too little, proving too much. The general character of this fallacy is to be found in a change of the point to be proved. In other words, we prove something different from what we profess to do, or what we ought to do as strictly relevant to the point at issue. As this fallacy generally occurs in discussion, it is said to be an ignoring or passing by of the proof of the contradictory of the conclusion in an opponent's argument. In order to expose it, we require to specify that element or condition which has been omitted, and which is needed to constitute a valid opposition in the circumstances.

This fallacy has three forms—(1.) That in which the terms of the proposition to be proved are changed. This is properly a passing into another genus,—*transitus ad aliud genus*. Thus: *Is the soul immortal?* It is proved, or attempted to be proved, that the soul has not always been, and, therefore, it is not eternal. This is a conclusion which, as it stands, is wholly irrelevant to the point at issue. There is, in fact, a *hiatus* unproved—viz., that that cannot always be which once was not. Or: *Is the person at the bar guilty or not of the charge made against him?* A counsel might prove the heinousness of the crime charged, the dreadful aggravations in this case, the need for making a public example of such a wretch; and so on. But all the same, such points are wholly irrelevant until the man's guilt has been established. Yet if an irrelevant conclusion is clearly proved, some people are very apt to suppose that this is the conclusion which was required to be proved. The clear proof of mysterious noises in a house at night goes a long way with many people to establish the existence of the ghost; and the clear vision of the corpse-lights on the moor may convince the belated traveller of the buried dead below.

§ 723. One very common form of irrelevant conclusion is, for a person arguing to suppose that when he has demolished an opponent's alleged proofs or reasons, he has established his own, that is, the opposite conclusion. All that he has done is to show that the arguments adduced in support of a definite conclusion were unsound.

§ 724. (2.) The second case of *Mutatio Elenchi* is when we

- prove less than we proposed to do or ought to do, in order to establish our point, or to form a true opposition or contradiction. Thus: *Were the Pharisees virtuous?* We prove that *they observed the law even in every respect*. As virtue is properly a matter of motive, and as our proof does not touch this question,—whether the observance was due to love of the law, or to ostentation, or love of praise,—we have proved less than we ought to have proved. At the same time, in a proof of this sort,—the too little,—our conclusion might be wholly relevant, though insufficient. It may, in fact, be one step, and that an important one, in the direction of the full or adequate conclusion. It may be admitted, as has been said, that the physico-theological argument, or argument from design, proves too little to establish the full conception of God; but if it proves power and knowledge, it is one step in the process, and it may be supplemented on other grounds.

§ 725. (3.) The third case is that of proving too much,—more than we need to do in order to establish our point. *Qui nimium probat, nihil probat*. But proving too much has two forms. (1.) In the one case, our conclusion may be perfectly true, only wider than we actually need; and in this instance it contains under it the conclusion in question. Thus, the question may be—*Was a particular substance thrown into the fire actually consumed?* I might prove that *it was incombustible*. Here I prove too much,—at least more than was needed for the point at issue. But it includes and settles the question of actual fact in the instance in hand. Or: *Is the soul immortal?* If I prove that from its nature it is *imperishable*, I have proved more than the mere fact of its immortality, but my conclusion includes the latter. In this first case, the common rule about proving too much is not to be taken strictly.

(2.) In the second case, we prove too much when, if the general principle on which our conclusion is necessarily based were admitted, we should have false inferences. This is the true *nimium probat*. This implies that the universal from which the conclusion is perhaps tacitly drawn is false. Thus: *Pity ought to be gratified because it is a natural feeling*. On the same principle ought *revenge, anger, &c.* Here, at least, we

have assumed too much,—more than is needed for our conclusion, and what equally justifies other conclusions which are unwarrantable.

§ 726. Persecution for the sake of opinion, as has been remarked, may be regarded as a practical form of *Ignoratio Elenchi*. The reformer who is executed, or the martyr who is burned at the stake, is not by this act necessarily proved in error; it is only shown that his opponents were stronger than he,—which is a very different point indeed. To make an end of man by violence or bullying, does not refute, by reason, or even make an end eventually of his conclusions.

§ 727. This fallacy is exceedingly common. When an opinion is propounded, we find people attacking it on the ground of its traditional character, its being nothing new, or its bearing, real or supposed, upon existing interests and institutions. These considerations are entirely out of place, until the truth or falsity of the opinion has been discussed and established on grounds of evidence. It is no reproach to truth that it is new; it is no reproach to truth that it is old. It is, or ought to be, no aid to falsehood that it has tradition in its favour. Novelty and antiquity are but shifting accidents; the real light to truth is the light of experience, which is both old and new,—which, as Bacon said, is never passing, but eternal.

§ 728. The *Argumentum ad Hominem*, as it is called, may be regarded as a form of Irrelevant Conclusion. This argument is a cheap and popular way of disposing of an opponent's reasoning. It consists in saying: This is your opinion now, and these are the reasons you give; but don't you remember that you held an entirely opposite opinion, just, say, two years ago? Your argument now is accordingly of no value. You are refuted out of your own mouth. This is the usual clap-trap of the popular orator. It is cheap, easy, and superficial. It is perfectly competent to say to him in return: Your reasoning is grossly fallacious. Even admitting that I have changed my opinion on the point in question, that does not prove my present argument or proof of the opinion to be false or invalid. I ask you to look at my reasons before you decide that. And so far as I am personally concerned for the change of my

opinion, that does not necessarily imply moral delinquency. I may have been seeking for, and may have got more light; you may be remaining in the blindness of your original bigotry. But this, too, is to be settled in a great measure by a consideration of the grounds of my opinion now adduced. And until you have examined these, and shown them to be worthless, you really have not advanced the counter-opinion one whit. This should settle the *argumentum ad hominem* style of attack; but those who use it are generally so much of the irrelevant type, that they do not know when they are overthrown in argument.

Of course, it must be admitted that there may be ground for a personal charge against a man who changes his opinions. But in this case the charge must be founded on the manner and circumstances of the change, not on the mere fact of the change itself. This really means nothing unworthy; it may mean something in the highest degree worthy and commendable.

§ 729. The *Argumentum ad Hominem* may, however, fairly be employed within certain limits. It is a legitimate form of reasoning to show that the assumptions or principles on which a person proceeds in a discussion, ought logically to lead him to certain conclusions. These may be conclusions which he desires to repudiate, or which, from their recognised falsity, show the falsity of the premisses which he has assumed. In the former case, he is proved an inconsistent reasoner; in the latter case, his principles themselves are controverted.

§ 730. What is known as the *Fallacy of Objections* comes under the head of *Mutatio Elenchi*.

This fallacy assumes that if objections of more or less force can be stated to a proposition or proposal, it is necessarily false, and ought to be abandoned. Some minds delight in objections, and are satisfied, if they can find them, without inquiring into their sufficiency or even relevancy. But it is hardly possible to state any proposition in general matter to which no objection can be made. The limited intelligence sees only a part, fixes on that, and a difficulty which it may suggest; sees a thing in one of its aspects, disapproves, and concludes that the whole proposition is not true, or the whole

scheme undesirable. The real question is as to the balance of objections or difficulties,—the side upon which the least are found to lie is that to be adopted. This applies especially to social changes, which never can take place without disadvantage to some interest or other—that is, to some individuals. The true question is as to the bearing of the change on the whole, and in the long-run.

§ 731. To the head of *Mutatio Elenchi* may fairly be referred a fallacy, or rather sophism, not uncommon in these days, which might be named, *Trick of Title*. Thus a critic, even in an infallible daily print, may blunder as to a matter of fact,—in a word, misrepresent the author he criticises. Should the person misrepresented write to the newspaper to set the critic right, his communication will probably be immediately labelled “An Author on his Defence,” when “Our Critic’s Misrepresentation” would have been more to the point. *Qui s’excuse, s’accuse*, is by no means true with an unlimited generality.

§ 732. The *Fallacia ad Verecundiam* may fairly enough be classed under the head of the *Mutatio Elenchi*. It is practically an appeal to one’s reverence for authority—one’s modesty in face of a great author or his opinion. Of this it may be said, that it contains a very good element,—the propriety of recognising the value of an opinion advanced by a man who has studied a particular subject. In many cases we should hardly think of disputing the judgment of an authority,—as, for example, the analysis of a recognised chemical expert. In some cases, even, we might respect the opinion of a doctor of medicine. But in general subjects, where we know thought is progressing, science is widening, historical research becoming more critical and discriminating, we should be more ready to withhold our assent, from mere authority. In certain departments, no quality, be it careful observation, or exact thinking, or speculative insight, or genius in any form, can give us an absolutely trustworthy result. For a time the modes or styles and the opinions of powerful men have their dominating influence. All literary history shows this. We have had Aristotle dominant for centuries,—the philosopher, the master; and no human intellect ever deserved these appellations more. None ever

• struck out lines so new and so profound as the Stagirite. Yet even he was not broad enough for human experience or human thought. And those who for centuries knew and believed only him, shut themselves out from the fullness of human knowledge, and that by one of the ways against which • he had warned them—practically a *Mutatio Elenchi*. For the question, as Aristotle himself taught, was not whether a conclusion was accepted, but whether it was the conclusion to be accepted. In the same way we had Ciceronianism in style, Johnsonese, and latterly, to some extent, Carlylese,—all probably representing advances on the past, and thus things relatively good, but altogether unworthy of exclusive acceptance and worship. There was no question here by people as to what was the best,—only a yielding to a powerful influence, or a regard to what, for the time, would be accepted or approved. This was a true *Mutatio Elenchi*.

§ 733. The *Fallacia ad Ignorantiam* may well come under the same head. This implies an appeal to the ignorance, limited reading, education, or reflection of the hearer or reader. A man says: Here is my opinion; here are my arguments. Can you refute this opinion? can you answer those arguments? No, I cannot; I confess I am beaten. Well, then, accept the arguments, or, at least, the conclusion. This appeal, as wholly relative to the ignorance of the hearer or reader, is entirely beside the mark. The ground of it is in no way decisive, either of the force of the arguments or of the truth of the conclusion. It amounts to this: You don't know any better, therefore accept this as true.

With this is closely connected the *Fallacia ad Populum*, or appeal to the passions, prejudices, interests of a mob, sect, or political party, in virtue of which they are led to accept an unsifted or unproved conclusion.

§ 734. The fallacy of *Mutilated* or *Isolated Quotation* may be brought under the head of *Mutatio Elenchi*. These practically issue in an irrelevant conclusion. Had the full quotation, or that taken in connection with the text, been given, the conclusion would have been different, and probably irrelevant to the point at issue.

§ 735. What is known as the *Fallacia Supponentis* may be referred to the head of *Mutatio Elenchi*. This, by appealing

to a man's preconceptions, interests, personal vanity, may induce him readily to recognise in things, probably only similar to what he knows and has studied, a true affinity, and thus lead him to an irrelevant conclusion, or a conclusion not justified by the data.

§ 736. Nothing contributes more to the prevention, or, not least, the shortening of discussion, than a preliminary attention to the state of the question. What is really the point at issue ought to be the first inquiry in the interest of intellectual honesty. Strong feeling or moral dishonesty may lead a man to attribute to an opponent a position which he does not hold; and not unfrequently a person will attack a position which his opponent does not dispute, simply because he is conscious of being unable successfully to impugn the point at issue.

§ 737. *Sophisma non causæ pro causa, or cum hoc ergo propter hoc.*

This arises when we take for cause that which is not cause, or mistake casual for causal sequence. When one event follows another, the question is whether the former is the cause of the latter, determines it, or whether it is a case of mere following, or simple conjunction. If we mistakenly hold the first for cause, we have no sufficient reason for inferring the second, should the first again occur; yet we may make this inference. When Rousseau assigned the commencement of the decay in manners in all countries to the first moment of the culture of letters, he might fairly be held guilty of the *non causa pro causa*. Instances of the same are the old fancies that the waning moon had a bad, and the full, or new, moon a good influence on human affairs.

Besides attributing causality where it does not exist, we may give as a reason of a conclusion a proposition which is insufficient to justify it. Thus:—

Orators are apt to mislead; therefore banish them from the State.

Heresy sometimes arises from the reading of Scripture; therefore prohibit the reading.

Religion has been the cause of civil wars; therefore suppress it.

These may be taken as instances at the same time of a

hiatus in the reasoning. We need proof of an intermediate proposition.

The fallacy here may equally lie in mistaking for an effect or consequent that which is not so, or which does not at all follow. Thus—from the connection between the nervous system and the consciousness, we may infer that the latter is a simple effect or result of the former; or because the brain is a condition of thinking, the brain is actually the thinker. This is the *cum hoc ergo propter hoc*.

§ 738. The *non causa pro causa* may be taken as extending to a subtle form of deception, in which one concept is, to some extent, unconsciously substituted for another, and so accepted as a reason, or at least as satisfying the preconceptions of what a reason ought to be in the circumstances. Of this the following may be given as an illustration:—

"The nebular hypothesis," says a writer, "was a recrement of ancient traditions about the origin of the universe from Nothing. The original mist of the nebular hypothesis is assumed to be of extreme tenuity,—of a density less than the one hundredth thousand part of hydrogen, the lightest gaseous body known to the chemist. By reason of this ethereal subtlety it was readily substituted, in the conceptions of the popular mind, for the old void from which the world was said to have emerged, and in the imaginations of those who look upon matter as a sort of inspissation of mind for the universal antemundane impersonal Spirit. It thus conformed to the assumption that, on any hypothesis respecting the mode of the world's formation, it must, 'in the beginning,' have been 'without form and void,' and at the same time satisfied the mystic yearnings after the ethereal and 'spiritualistic.' " ¹

§ 739. One very common form of the *non causa pro causa*, is not simply the mistaking of the individual object for a cause when it is not so, but the general misapprehension of *law* for *cause*. Physical law, in particular, is, as observed by us, simply uniformity of sequence. It is no doubt much more than this; but this is what we observe, and what we are too ready to identify with the whole of it. In this way we come to attribute efficiency or causality to what we call *law*, whereas

¹ Stallo, *Concepts of Modern Physics*, p. 292.

law is but the mode, the uniform mode, in which causality is displayed. Laws are not causes, but the modes of action of causes. An event is not explained by being referred to its law, or the uniform kind of occurrence to which it belongs; it is only properly explained when we refer this law to a cause; and this cause, again, may be carried backwards to another, and must be carried ultimately to a First Cause or Power in things; the only other alternative being the suicidal one of an endless regress.

§ 740. The connection between *supposed sign and thing signified* comes under this head. The common illustrations are the old popular impressions of the connection between an eclipse or a comet, and the death of an eminent person, or a war which might follow in time. Belief in dreams and various prognostics, as signs of events to follow, is of the same class.

“Solem quis dicere falsum
Audeat? ille etiam cæcos instare tumultus
Sæpe monet: fraudemque et operta tumescere bella.
Ille etiam extincto miseratus Cæsare Romam;
Cum caput obscurâ nitidum ferrugine texit,
Impiaque æternam timerunt sæcula noctem.”¹

§ 741. What is known as the *Fallacia fictæ Universalitatis*, arises either from imperfect induction, or perhaps more commonly from the *non causa pro causa*—the *cum hoc ergo propter hoc*. Because the subject has been followed by the predicate in one or two instances, we hastily generalise the subject or antecedent as cause. The examples already given of the *non causa pro causa* illustrate this point.

But in truth the liability to this fallacy is inseparable from the fullest Observation and the most ample Induction. Universal laws, or laws accepted as such in the course of science, have frequently proved to be by no means universal. Nothing appeared to be more completely established by Observation and Induction, carried on through the ages, than that the satellites in the planetary system moved round each planet in a uniform direction. But what turned out to be the fact? The addition of Uranus to the system, as has been noticed;

¹ Virgil, *Georg.*, I.

showed planets moving in a direction wholly contrary to what had been supposed the universal mode; and the further discovery of Neptune, with its satellites moving like those of Uranus, gave the *coup de grâce* to the assumptive universal law. In this there is a sound practical lesson of modesty, and a rebuke to dogmatism, which can be appreciated only by those physical observers who not only note, but think.

THE END.

CORRIGENDA.

- Page 17, line 16, for "a great part," read "the whole."
- " 43, " 25, for "precepts," read "percepts."
- " 271, " 35, for "Hermicæ," read "Hermeiæ."
- " 294, " 3, for "veritus," read "veritas."
- " 310, " 4, read "μαλακή."
- " 310, " 5, read "μαλακή."
- " 18, " 35, after "Summulæ," insert "in their present form."

